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**School of Computing, Engineering and Information Sciences**

**The Exploration and Adaptation of Soft Systems Methodology  
using Learning Theories to Enable more Effective Development  
of Information Systems Applications**

**Adrian Small**

A thesis submitted in partial fulfilment  
of the requirements of the University of Northumbria  
for the Degree of Doctor of Philosophy

**2007**

# Abstract

According to Lyytinen and Robey (1999), information systems development (ISD) involves risk. This risk is regularly being taken by managers and employees within an organisation but the outcome of such information systems development projects many become a failed information system (IS). The problem is further compounded through the lack of learning about such failures, and unsuccessful/negligible efforts to try and avoid such mistakes in the future (Lyytinen and Robey, 1999).

The contribution to knowledge of this thesis is the development of a framework to incorporate a learning approach within information system application (ISA) projects. This thesis puts forward the need for an embedded learning approach and examines its importance for organisations. It is argued that more attention needs to be placed on generating learning because many individuals within organisations focus mainly on their operations and less on other processes. Three areas of theory are argued to relate to exploring these issues, namely how IS can currently be designed and implemented, what role the area of the learning organization can contribute in helping promote and embed a learning approach into an ISD methodology and finally, what theories of learning can be applied to these two bodies of literature. From addressing such issues, the main question of this thesis is how a learning approach can be incorporated into soft methodologies for the design and implementation of information systems applications.

By examining a number of soft methodologies and arguing for the expansion of Soft Systems Methodology (SSM), or as the expansion is labelled, Soft Systems Methodology eXpanded for Learning (SSM<sup>XL</sup>), a manufacturing organisation is used to test out the framework in practice. The first cycle of action research investigated how SSM<sup>XL</sup> worked in practice. The second cycle of action research, while not using a formal framework, investigated how these participants implemented and managed the technology. Reflecting back on the technology management literature, a technology management process framework (TMPF) is identified and adapted to try and further embed the learning individuals have obtained from the SSM<sup>XL</sup> framework. A discussion on how the two frameworks can be joined together and used in practice is undertaken. This framework is labelled as Soft Systems Methodology eXpanded for Learning and incorporating Technology Management (SSM<sup>XLTM</sup>). A second case is used to test this now developed SSM<sup>XLTM</sup> framework. The second case involved a National Health Service (NHS) organisation. This second case identifies learning points that support or can pose problems with the SSM<sup>XLTM</sup> framework allowing any refinements to be made.

This work finishes by firstly, providing a detailed discussion on the research process this work adopted as well as undertaking an evaluation of the SSM<sup>XLTM</sup> framework. Secondly, the conclusions address how well a learning approach can be incorporated into a soft methodology for the design and implementation of information system applications (ISA). Lastly, it is stated how this SSM<sup>XLTM</sup> can impact on theory and practice.

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# Authors Declaration

It is hereby declared that while registered as a candidate for the degree for which submission is made, I have not been a registered candidate for another award at any other University. It is also declared that the thesis is the authors own.

Adrian Small  
(Candidate)

Signature:

Date:

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# Terms of Reference

AIM: Appreciative Inquiry Method

APQC: American Productivity and Quality Centre

CATWOE: Customer, Actor, Transformation process, Weltanschauung, Owner, Environmental constraints

CCM: Customer Complaints/Concerns Management

CI: Co-operative Inquiry

COP: Community of Practice

COPs: Communities of Practice

CST: Critical Social Theory

DSS: Decision Support Systems

ETHICS: Effective Technical and Human Implementation of Computer-based Systems

HAS: Human Activity System

HR: Human Resources

I/C: Immersion/Crystallisation

ICT: Information and Communication Technology

ICTs: Information and Communication Technologies

ID: Identification

IS: Information Systems

ISAEP: Identification, Selection, Acquisition, Exploitation, and Protection

ISA: Information System Application(s)

ISD: Information Systems Development

ISP: Information Systems Prototyping

IT: Information Technology

ITI: Interaction-Transformation-Interaction

KE: Knowledge Elicitation

LO: The Learning Organization

MIS: Management of Information Systems

MOT: Management of Technology

NHS: National Health Service

NPFIT: National Programme for Information Technology

OL: Organizational Learning  
PAR: Participative Action Research  
PSP: Problem Solving Process  
R&D: Research and Development  
SISP: Strategic Information Systems Planning Process  
SISTeM: Soft Information Systems and Technologies Methodology  
SSADM: Structured Systems Analysis and Design Methodology  
SSM: Soft Systems Methodology  
SSM<sup>XL</sup>: Soft Systems Methodology Expanded for Learning  
SSM<sup>XLTM</sup>: Soft Systems Methodology Expanded for Learning and Incorporating  
Technology Management  
TM: Technological Management  
TMAP: Technology Management Assessment Procedure  
TMPF: Technology Management Process Framework  
ZPD: Zone of Proximal Development

# Chapter One: Introduction

## 1.0 Problem Overview

Failure of information system development (ISD) projects is not new. ICT failure is still a talking point in trade publications and other articles. For example, an online article by McCue (2005) draws on data from the Chartered Management Institute (CMI) sixth annual business continuity survey which highlights that 440 managers (70%) see information technology (IT) failure as a big threat to organisations. It is not surprising then that Lyytinen and Robey (1999) note that information systems development can be a big risk. One of the key features that Lyytinen and Robey (1999 p85) state refers to individuals within organisations failing *“to learn from their experience in systems development because of limits of organisational intelligence, disincentives for learning, organisational designs and educational barriers.”* Many articles have been written that promote ways in which managers and other individuals within organisations can learn from ISD failures (e.g., Irani, Sharif and Love, 2001; Southon, Sauer and Dampney, 1999). Despite such research, these lessons are not being learnt.

## 1.1 Background to the Area of Research

The reason this research is important is that firstly, the failure rates of ISD projects may not need to be as high if the learning element is promoted throughout the development phases. Secondly, a gap currently exists in the area of designing, implementing, and managing information systems applications (ISA) with an emphasis on the learning the process can achieve. Much research has been done in the area of methodologies for developing information systems (IS) (e.g., Avison et al., 1998; Checkland and Scholes, 1990; Russo and Stolterman, 2000; Stowell, 1995; Vickers, 1999; Wilson, 1984), as well as how individuals within an organisation could help design their ISA (e.g., Stowell and West, 1994). Research has been conducted in the area of using IS for developing and gaining a strategic advantage (e.g., Earl, 1987; Fors and Moreno, 2002; Kaye, 1993; Remenyi and Sherwood-Smith, 1999; Venkatraman and Zaheer, 1994). Authors such as Henderson and Venkatraman (1994) and Earl (2002), have researched how individuals can align ISA to the organisation's strategy. Research has also been conducted to investigate how IS can be managed (e.g., Maguire, 2002; Williams, 1997; Zehner, 2000) at the level of the organisation. Similar to this research, Phaal, Farrukh and Probert (2004a, b, c), and their

colleagues at the University of Cambridge, have employed Technology Roadmapping as an approach individuals within organisations can use to develop their IS for strategic planning purposes.

Limited work (e.g., Multiview and ETHICS) has identified methods of designing and developing IS for the purpose of embedding and enhancing the learning of individuals. It is proposed that work also needs to be undertaken on how an information systems development (ISD) methodology with an embedded learning philosophy could be developed. Managers of organisations do not want to spend time developing solutions to problems which can leave the whole organisation in a worse condition overall. A more practical way to design and implement IS which can offer learning mechanisms to complement information systems development (ISD) approaches should be established. The intended outcome of this research will be to enhance a pragmatic information systems development framework that individuals can use to develop IS with an emphasis on learning. This practical approach will embed a learning approach into the design and implementation process of an IS project as well as create a learning environment for all of the participants involved in the project. It is argued that this is an important alternative to the more structured and goal orientated approach to ISD that may inhibit learning. These structured approaches can be of value in some instances but they are less so in others as they do not pay attention to the learning that can be achieved about the problem situation. To address the problem highlighted, a framework will be developed that encompasses a learning perspective within the context of ISD projects that once undertaken will be left embedded within an organisation.

If a solution is to be found, previous work has to be acknowledged and furthered through the ideas presented. This work also has to encompass new work from other fields and disciplines if the proposed solution could be successful, as new thinking could provide a better insight. New insights to fill the gap identified must address methodological development of ISA, the design and use of ISA, the management of ISA, and learning theories. While there are a number of ISA methodologies and frameworks that take into account certain learning capabilities (e.g., Soft Systems Methodology, Multiview, ETHICS), it is argued there is still space to further develop a specific component within them. In order to do this, it is proposed that the fields of learning theories and conditions that contribute to the creation of the 'learning organization' should be addressed along with



the technological aspects of ISD. It is through addressing these areas that a framework can be developed that aims at enhancing the learning that can be achieved through the design and implementation of ISA.

### **1.1.1 The Need for this Research**

The importance of this research is highlighted by the amount that has been written about the learning organization (see Garratt, 1999; Lennon and Wollin, 2001; Moilanen, 2001; Reynolds and Ablett, 1998; Senge, 1990) with little being applied in practice. While it is not the aim within this research to develop a learning organization, this body of work attempts to provide a practical aspect to learning in organisations. The learning organization theory acknowledges the developments in IS and how they are altering an organisation's culture and style of management (Pemberton and Stonehouse, 2000). It is proposed that little if any research has tried to explore the relationship between the learning organization and the design and implementation of ISA with an emphasis on learning and how this is embedded through the design and implementation approach. It is stated that the change in organisational practices is related to the technological revolution (Appelbaum and Gallagher, 2000). It could be considered that managers identify the learning organization as a way to handle change in response to new IS developments but are not utilising current ISD projects to help enhance organizational learning. It is important that a link between the learning organization and IS is established.

There are over 50 learning theories listed (see Anderson, 1976; Bandura, 1986; Cross, 1981; Lave, 1988; Vygotsky, 1978) at the theory into practice website (<http://tip.psychology.org/>) that have only recently started to be applied within the learning organization literature. How these theories relate to the learning organization literature needs to be addressed. The closest theory to be applied to an organisation is the single and double-loop learning theory developed by Argyris and Schön (1978, 1996). Even though Argyris and Schön's (1978, 1996) research is well referenced, it is argued that further research on learning theories needs to be established in relation to the learning organization. The next problem comes from the area of information systems development (ISD) theories existing as a separate field of knowledge. The literature seems to concentrate on planning, development, and implementation, but not on the softer learning issues that the project or the technology could provide. As has been mentioned, technologies to promote learning are stated to be involved in the learning organization and organizational learning (see Pemberton and Stonehouse,

2000) but it is not made clear how they are undertaken. Examining a theory of learning and applying it to the design, implementation, and use of ISA as well as to an organisation is important. It is this synthesis between the three areas of designing and implementing ISA, the learning organization and learning theories that will allow exploration into the implementation and use of ISA for promoting learning within organisations.

## 1.2 The Research Question

The research question for this work is stated as:

*How can a learning approach be incorporated into soft methodologies for the design and implementation of information systems applications (ISA)?*

It is proposed that to answer this question three areas will be examined: Those of literature and theory, which include designing and implementing ISA, the learning organization, and learning theories. These highlight a number of objectives that need to be addressed.

### 1.2.1 The Objectives of the Research

In order to answer the research question, and hence propose a solution to fill the gap identified, a number of key objectives must be considered that will focus the research. The objectives are:

- To critically review the literature, and identify what theories of learning and information systems development can be applied to learning in organisations.
- To explore and analyse how these theories of learning can be applied to information systems development.
- To develop and evaluate the use of a learning process for effective design and implementation of information systems applications.
- To develop a learning framework encompassing the design and implementation of information systems applications.

Through focusing on the first objective, literature will be reviewed that can provide the theory that this research will require. Firstly, examining which theories of learning can be applied to learning specifically in organisations can provide a focus on how learning can be identified as taking place. Secondly, examining the ISD literature with an emphasis on

learning organizations will provide the basis of the learning framework that this research seeks to develop. From identifying what theories of learning can be applied to learning in organisations these theories can then be investigated from the perspective of ISD. This focus will allow any similarities or differences to be drawn out and consequently to discuss how applicable these theories will be when using the learning framework that is to be developed from the ISD literature reviewed. The third objective requires the evaluation of how the learning theories identified can be incorporated into a methodology that will help individuals within organisations design and implement more effective ISA. From the outcomes of these three objectives, the final objective is the development of a learning framework that encompasses the design and implementation of ISA.

### **1.3 Primary Research**

Two organisations participated in the research and access was allowed to each organisation with appropriate resources being made available. The selection of organisations was decided upon by firstly, demonstrating a commitment to allow access. Secondly, each organisation required the design and development of an IS. Organisation number one was identified as a manufacturing company that specialises in breathing apparatus operating out of the north of England. Organisation two is part of the National Health Service (NHS) and is involved with supplying ISA throughout the Newcastle Trust. Within both organisations, particular projects were identified that involved the development of a technology with the purpose of creating suitable learning conditions.

The methodology used to collect the data used two separate methodological approaches with a justification on the commensurability of both. The methodology incorporates the areas of participative action research (PAR) and co-operative inquiry (CI).

### **1.4 Proposed Contribution to Knowledge**

Three areas of research have been identified and are considered important for this research. Figure 1.1 is a conceptual model to use the terminology of Miles and Huberman (1994), and has been developed to show how these three areas, stated as: the ‘learning organization’, ‘learning theories’ and ‘information systems’ are related and will contribute to knowledge in this work.

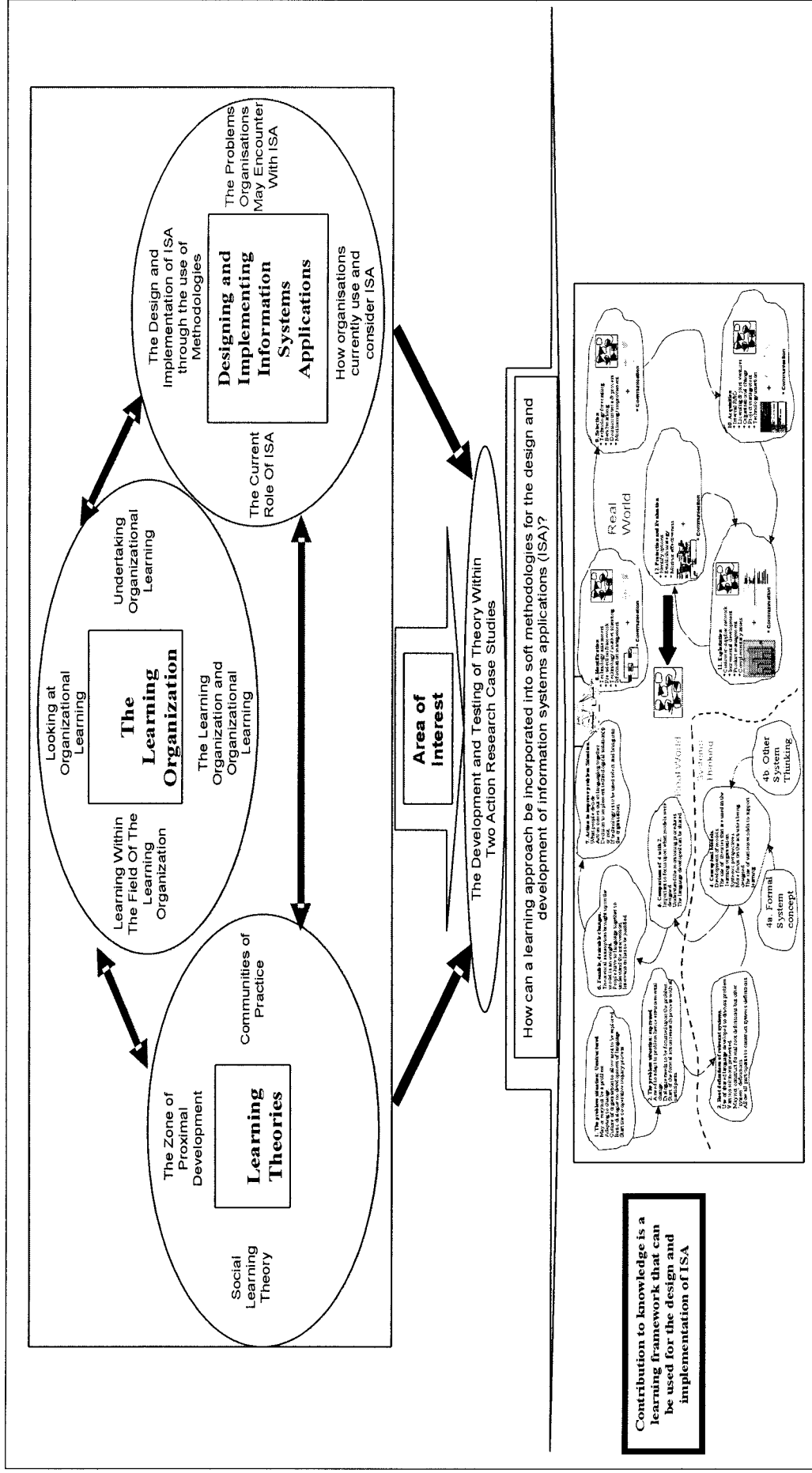


Figure 1.1  
The Proposed Contribution to Knowledge

The contribution to knowledge shown at the bottom of Figure 1.1 is the development of a framework to incorporate a learning approach for information systems development (ISD) projects. Why embedding a learning approach is important for organisations, and the need for them to be incorporated within the design and implementation of an ISA, is examined. Activities can be undertaken by individuals within organisations to achieve learning. These may be intentional or emerge as part of the daily activities of individuals within an organisation. It is argued that more attention needs to be placed on generating these learning activities because many individuals focus mainly on their operations and less on other processes. The argument is stated that enhancing the learning that can be achieved can provide more successful project outcomes as well as address the complexity of project success. The incorporation of processes to embed and generate learning within an ISD framework will enable more suitable ISA to be developed. Three areas of theory are argued to relate to exploring these issues, namely how ISA can currently be designed and implemented, what role the area of the learning organization can contribute and finally, what theories of learning can be applied to these two bodies of literature.

The learning framework that is developed is not a precise method of implementation but instead deals with a set of key issues. The framework is a generic inquiry into the domain of the design and implementation of information systems applications, through embedding a learning approach within an ISD framework. The theoretical contribution comes from stating what issues matter for individuals within an organisation, when trying to create learning through IS developments, as well as stating specific ways to think in relation to IS. From the practical element of the research, an interpretation of the current theories has been constructed with the principles that are revealed through practice.

### **1.5 The Structure and Overview of the Thesis**

This thesis is set out in ten chapters (including this one) with two chapters dedicated to reviewing the literature, one chapter explaining how a soft methodology was expanded and discussing the resulting learning framework, one chapter detailing the epistemological and methodological implications of the research, four chapters detailing what practical work was undertaken and finally one chapter listing the conclusions, further research and implications of the research process. An overview of each chapter is listed below:

*Chapter Two:* The current perspective of IS is explored in relation to how individuals within organisations perceive and consider technologies. An overview is presented on how work has been undertaken within organisations and how the rise of technologies has changed these practices. A number of methodologies are discussed that may help with the design and implementation of ISA. Soft Systems Methodology (SSM) was found to be a suitable approach through an argument for an increased participation of end users of planned ISA. The approach has been subject to a degree of criticism which could be alleviated if literature on the learning organization were incorporated into the methodology.

*Chapter Three:* The learning organization literature identifies a number of advantages to any organisation that can achieve the learning organization status. The investigation uncovers that organizational learning is undertaken by individuals for the whole organisation, whilst the learning organization states characteristics an organisation should resemble. In order to address these issues, it is argued that a language, how individuals speak together, is important, if issues that the literature relating to organizational learning implies are to be obtained. This social process is seen as important as learning is regarded to be complex (Kautz and Thaysen, 2001) with different individuals being able to learn in different ways (Cheetham and Chivers, 2001). Through reviewing the literature, it is identified the theory of social learning as being relevant when trying to investigate learning activities being undertaken within an organisation. The theories of triadic reciprocity (Bandura, 1977, 1986), the zone of proximal development (Vygotsky, 1978) and communities of practice (Lave and Wenger, 1991; Wenger, 1998) are used. While each theory identifies different aspects of the learning process, it is argued that each is commensurable with the other two. By incorporating more than one theory, it improves the chances of learning missed in one context being seen in another (Cheetham and Chivers, 2001). Finally, the expansion of the SSM framework (SSM<sup>XL</sup>) is undertaken through using the learning organization thinking identified.

*Chapter Four:* Drawing on the literature reviewed in Chapters Two and Three, Soft Systems Methodology (SSM) is expanded to take into account the work of the learning organization field. A discussion on how this expanded SSM methodology, labelled as SSM<sup>XL</sup>, can be used in practice is undertaken. As the focus of this research

is on investigating how a learning approach can be incorporated into soft methodologies for the design and implementation of ISA, SSM<sup>XL</sup> only deals with problem exploration and to an extent IS design. While Chapters Six and Seven provide an overview and analysis of the first practical case, the learning points identified and drawn out helped identify issues associated with IS implementation and management. A review of the literature attempts to identify a suitable body of literature that incorporates the learning points identified. This second body of literature comes from the field of technology management and in particular management of technology. A technology management process framework (TMPF) is identified and adopted so that it can be joined with the SSM<sup>XL</sup> framework to form an approach to ISA design and implementation with an emphasis on learning. It is important to remember that this learning framework was developed through theory and practice. As the learning framework (Soft Systems Methodology eXpanded for Learning Incorporating Technology Management) (SSM<sup>XLTM</sup>) is the main contribution to knowledge, it is presented in Chapter Four to specifically highlight this contribution. The remainder of Chapter Four is used to discuss how the two frameworks can be joined and how this learning framework (SSM<sup>XLTM</sup>) can be used in practice.

*Chapter Five:* There were various paths this research could have taken. Engaging in the usual inductive or deductive approaches was argued to be unhelpful. From this debate, the work of Crotty (1998) was used as guidance in developing a research strategy. The research approach adopted for this study represented an epistemology of constructionism with a theoretical perspective of symbolic interactionism. While both the epistemology and theoretical perspective are discussed and justified based on what is argued as how knowledge is created, the research could have applied a number of methodologies to try and answer the research question and objectives. Action research was argued as a methodology that could be used. On discussing the advantages and limitations of action research a methodology that combined the areas of participatory action research and co-operative inquiry is argued for, that combines the advantages of both approaches to research. From this argument on the suitability of a methodology, a full explicit framework based on the work of Lau (1999) is declared. The methods used to collect the data are stated before discussing how the data will be analysed and presented.

*Chapter Six:* An overview of the work undertaken at the manufacturing organisation is presented. A time line is constructed to show the stages and duration of the project as well as who was interviewed and when. The practical work is attached to the expanded SSM framework (SSM<sup>XL</sup>) developed in the literature as a guide to how the work unfolded. The main purpose is to provide the reader with an overview of the work undertaken, an insight into the organisation and the problems uncovered that can affect the use of the SSM<sup>XL</sup> framework. While basic analysis of the data is undertaken, the more detailed analysis is undertaken in Chapter Seven.

*Chapter Seven:* The first cycle of action research is analysed within the manufacturing organisation. The chapter is divided into three areas. Firstly, a summary into how the designed and implemented ISA is currently being used and any issues participants may have is given with reference to a more comprehensive account provided as an appendix. Undertaking this analysis allows a picture to be built up before focusing on how SSM<sup>XL</sup> that was developed within the literature performed in practice. The final area draws out the advantages and limitations of the SSM<sup>XL</sup> framework. Throughout Chapter Seven, an attempt was made to identify and discuss the learning theories used and their relation to practice.

*Chapter Eight:* From the outcomes of Chapter Seven, Chapter Eight is used to focus on the second cycle of action research within the manufacturing organisation. The second cycle adopted a more grounded approach in investigating how the work undertaken was used to develop and implement an ISA. From these outcomes, a number of key learning points were identified related to a gap in the literature concerning technology management. It was from this literature that the second framework was identified and joined with SSM<sup>XL</sup> to form the learning framework (SSM<sup>XLTM</sup>).

*Chapter Nine:* From the research undertaken with the manufacturing organisation where the resulting learning framework was identified and discussed, a second case was sought to re-test the learning framework. Chapter Nine is used to detail the research undertaken within the National Health case. This case, while the researcher was not able to re-test the complete learning framework, demonstrates the problems of engaging participants to become co-researchers and co-subjects. What this case



did allow was for different modelling approaches to be undertaken and how these could impact on using the learning framework. While the latter phases of the learning framework could not be re-tested in practice, a number of follow up interviews were conducted to analyse the approaches that were undertaken to explore how applicable the learning framework would be to the participants of the National Health case. The final part of this chapter allows the researcher to undertake a detailed discussion on the research, the methodology developed to undertake the research, and the learning framework that was a result of this research.

*Chapter Ten:* The conclusions of this research are stated. The research question and objectives are argued before stating how this work contributes to knowledge as well as providing a number of issues that could face academics, consultants and other practitioners, managers of organisations, and participants and teams who want to design and implement ISA. Recommendations for future research are detailed as well as drawing out the methodological implications that this work has had to face. Finally, this thesis ends by undertaking a number of personal reflections.

## Chapter Two: 'Soft' Approaches to Information Systems Development

### 2.0 Introduction

This chapter examines the work on 'soft' approaches to information systems development (ISD). These approaches are considered as opposed to the more traditional 'hard' engineering methods due to their varying recognition of learning as a key element for more effective requirements capture and to the ISD process. Firstly, however, the nature of IS applications (ISA) are discussed. Secondly, how information systems development (ISD) projects are discussed with a focus on three soft methodologies. It is these soft methodologies that are considered more capable in generating learning activities when designing and implementing information system applications (ISA) as a process to tackle the high failure rates of such IS projects.

Many terms can be identified within the area of information systems development (ISD) including 'information and communication technology' (ICT), 'information systems application(s)' (ISA), 'information technology' (IT) or 'information systems' (IS) to refer to a specific aspect of technology. Lewis (1994) agrees, as he sees this area as one of the most undisciplined, with many disagreements and confusions arising. A firm name for the field has still not been stated (cf. Fors and Moreno, 2002). In summary, Checkland and Holwell (1998) accept that information technology (IT) is different to information systems (IS). The difference between IT and IS relates to a philosophical difference (Stowell, 1995) in the artefact of a technology (IT) and the interaction between an individual and the data the information technology produces (IS). However, as Lyytinen (1987) points out, newer technologies such as management information systems (MIS), decision support systems (DSS), and other office applications are now being used. With an array of technologies, classifying all of them into one category may be difficult. This could be reason why such projects are finding difficulties due to confusion in language and the resulting outcome being unsuitable technologies being implemented. The outcome of such ISD projects are then being classed as failures. As a way to refer to the hard artefact that is a technology, as well as the information systems application (ISA) and

the human activity system (HAS), the term information system (IS) has been adopted for the purpose of this study.

Authors are keen to relate IS to learning (e.g., Kautz and Thaysen, 2001; Mayo and Lank, 1994; Pedler, Burgoyne and Boydell, 1997; Pemberton and Stonehouse, 2000; Schein, 1994) and to knowledge management (e.g., Carneiro, 2000; Hedelin and Allwood, 2002; Mentzas et al., 2001; Nonaka, Reinmoeller and Senoo, 2000; Robertson and O’Malley Hammersley, 2000; Zuboff, 1988). Information systems applications are being seen as a support to these areas by helping individuals to create new learning and provide places where knowledge can be stored. From these stores anybody who is associated with the organisation can have access to the data. It is this ‘learning’ as stated by the above authors, or, alternatively considered, by numerous authors as the creation and use of ‘knowledge’ (see de Gues, 1988; Drucker, 1993; Lee, Bennett and Oakes, 2000; Murray, 2002; O’Keeffe and Harington, 2001; Senge, 1990) that many managers hope will add a unique competitive advantage to their organisation. It is acknowledged through the use of ISA, that individuals who require information or knowledge are being the most affected (Scott Morton, 1991) by such ISD projects. As the main theme being investigated is that of how a learning approach can be incorporated into soft methodologies for the design and implementation of ISA, the area of learning must be acknowledged. The area of knowledge may also play a role which potentially poses a problem as demonstrated by the references to the work of many authors. It is important to understand how these concepts are currently related. These ideas are depicted in Figure 2.1 and form the base of this investigation.

Figure 2.1<sup>1</sup> is placed upon top of Figure 1.1 (Chapter One) to demonstrate how the three areas of ISA, knowledge and learning are currently regarded with relation to this research, as stated by the authors above. Figure 2.1 is used to try and demonstrate that ISA are being considered to develop knowledge (e.g., Carneiro, 2000; Hedelin and Allwood, 2002; Mentzas et al., 2001; Nonaka, Reinmoeller and Senoo, 2000;

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<sup>1</sup> Figure 2.1 is not meant as a theoretical model demonstrating how each area relates to the others, but is meant as a starting point for ideas to be developed and refined throughout the literature review, which, alongside the primary research, will answer the research question.

Robertson and O'Malley Hammersley, 2000; Zuboff, 1988) (the horizontal solid arrow) but neglect the learning processes such an approach can contain.

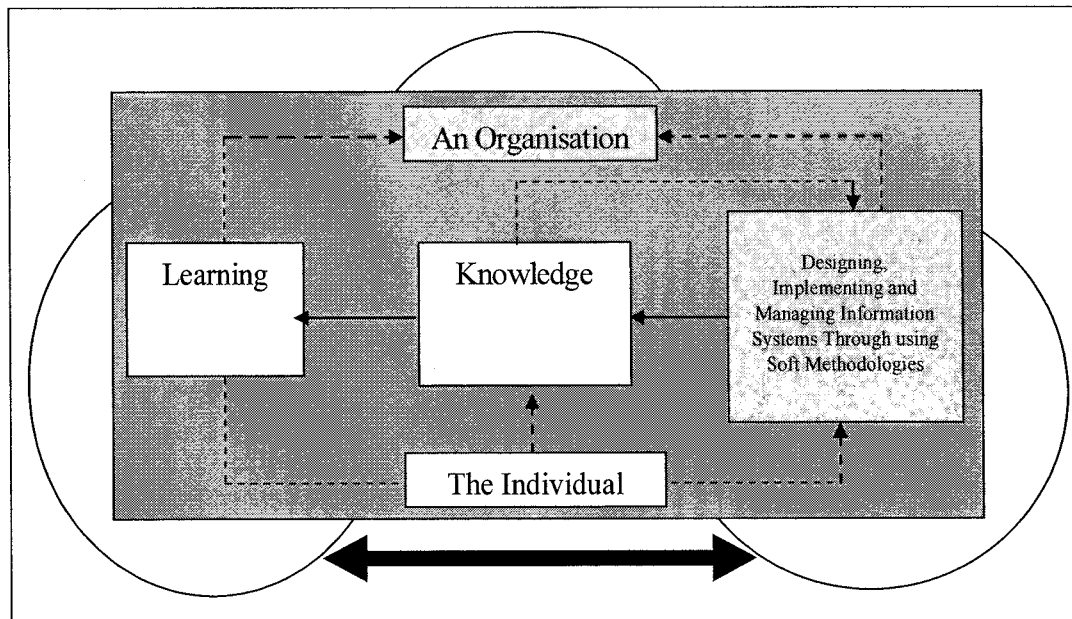


Figure 2.1

## *The Relationship between Information Systems, Knowledge, and Learning within an Organisation*

If indeed, ISA help create knowledge, it is also theorised that knowledge can also be stored within designed and implemented ISA (the dotted arrow coming out of the top of the knowledge box). This area of research has received a lot of attention with studies being commissioned by the American Productivity and Quality Centre (see APQC, 1997a) to examine how ISA can support knowledge management.

Knowledge somehow gets transformed (the solid horizontal line between knowledge and learning) within, or between individuals who ‘learn’ (see Bandura, 1986; Lave and Wenger, 1991; Vygotsky, 1978; Wenger, 1998). This learning and knowledge is then considered to add to an organisation’s competitiveness (e.g., Ghosh, 2004; Lee and Yang, 2000; Senge, 1990; Senge et al., 1994; Tofler, 1980).

The problem relating to the ‘learning’ of one individual may only be knowledge to another individual (the dotted arrow from the bottom of the learning box), whilst also being placed within ISA, which again, may only constitute knowledge to another individual (e.g., Drucker, 1995; Lee and Yang, 2000; Little, 2002; Zuboff, 1988), or be unrecognisable to a third (Lewis, 1994). Whilst these processes take place, they are undertaken by the individual – which is why ‘individual’ has been placed at the

bottom of Figure 2.1 and is implied to undertake knowledge and learning, as well as the design, implementation and management of ISA. An organisation is considered to undertake its work through the combination of all individuals' knowledge and learning, with support from ISA in what can be described as a form of corporate learning (the arrows coming out of 'learning' and 'designing, implementing, and managing information system applications'). The problem is that the learning available to individuals may bear relation to how individuals design, implement, and manage ISA within an organisation. It is argued that the process used to design and implement ISA can provide an environment that can enhance individuals learning activities. Lyytinen and Robey (1999 p86) support this when they state that "*to avoid learning failure it is necessary for IS developers to learn from their own and from others experiences and to use this knowledge to change their development practices.*" Miller (2001 p308) believes that learning within organisations relates to the environment individuals are exposed to, which can easily be seen through '*conceptual experiments*'; but whilst the environment is argued to play a role (see Bandura, 1986), learning is not as simple as this.

Methodologies can be used to undertake the design and implementation of ISA, but the learning opportunities embedded within them needs to be discussed. This is why it is argued that the softer methodologies would add more value in helping with the learning this research is being conducted to investigate. By undertaking this task, this thesis will deal with issues that relate to the design and implementation of ISA, and how learning can play a role. The problem that Checkland and Holwell (1998) quite rightly point out is the confusion that the labels of data, knowledge, and information pose, as well as the relation between them. Whilst this thesis deals with these terms, no attempt is made to make definitive definitions of each, but the work of other authors will be drawn on.

In this chapter, we explore the two shaded areas of Figure 2.1 (ISA and the organisation), by examining how information system applications are currently being used and seen. Following this review, a way information systems applications *could* be viewed, is explored. The outcome leads into how ISA can be designed using methodologies and in particular the use of soft methodologies. This section draws on a number of methodologies that have been used over the past 40 years, and continue

to be used. Before these reviews are discussed however, an introduction into the role of information systems applications is undertaken.

### **2.1 Introduction into the Role of Information Systems Applications and the Organisation**

Since the 1950s, researchers have discussed the effects technologies will have on organisations (Crowston and Malone, 1994). Johannessen, Olaisen and Olsen (1999) highlight the scepticism that is directed towards the potential benefits of IS. As an example, the problem with IS can be summarised by Argyris (1999) when he argues that individuals within an organisation will not design something that they know will fail; ISAs are being designed, but once in use are then being classed as a failure. The problem is that information systems applications can sometimes be considered as infallible (Tofler, 1980) but are capable of breaking down (Tofler, 1980), especially if key issues have not been explored at the design phase. Investigations have to be conducted to find out why the design was wrong and what consequences the organisation was not aware of; those that ultimately caused the technology to be classed as inappropriate. These investigations could lead to an aspect of learning that could help the organisation in the future to, (1) learn why an ISA was not successful and (2) understand what would need to be done in future to design, implement and use an ISA that would meet the criteria for why the IS is to be developed. It is theorised that this is not a straight-forward process. This thinking is believed because the IS used need to be purposely selected and managed.

The selection of IS by choice, through decision makers, has not really been focused upon, as the making of a 'choice' implies a model of rationality (Currie, 1995; Hedelin and Allwood, 2002; Masino, 1999) that is very rarely investigated. The problem is that the decision making process is not seen as a rational choice, but becomes a spontaneous action taken from solutions that have worked in the past (Hedelin and Allwood, 2002). If the previous statement holds true, IS can be considered as a major problem, as the expected outcomes do not match the actual outcomes for reasons an organisation have not envisaged, or through being forced to make a choice that may not solve the current problem. If individuals of the organisation are using a rational decision making processes based upon economic theory then decisions will be made based upon quantitative models (Currie, 1995;

Lewis, 1994). Quantitative measures may not take account the value learning and knowledge may bring to the individuals of the organisation. If current and previous learning, as well as knowledge, are not being taken into account of, individuals will have to use some other mechanism to try and guide the implementation of any ISA.

Along with problems of making decisions, it is also not so simple for individuals within an organisation to design an IS or to make sure individuals have access to the latest ISA. Factors such as socio-technical issues (see Mumford, 1996) also have to be understood. If individuals only implemented information systems within the organisation, it could be creating instances of what Zuboff (1988) has labelled 'automation'. Zuboff (1988) describes and regards 'automation' as a similar process to Taylorism, as a control mechanism over knowledge that is helping to shrink the workforce. If individuals are identifying IS in this way, the benefits the ISA would hope to bring to the organisation could be thought to be highly reduced. These issues relate to how work is undertaken.

### 2.1.1 A Brief Overview upon the History of Work

The problem of just designing and implementing an ISA without drawing on a wide range of stakeholders can restrict the learning that could be achieved. The history of work has shown these problems in the past. Zuboff (1988) investigates a history of the individual at work within her book. The important points considered can be seen in Table 2.1.

The 'Worker' Sought the Initiative	The Management of an Organisation Sought the Initiative
1. Individuals use their bodies as a tool to undertake work. By using the 'body', individuals learnt skills and hence learnt.	5. The industrial revolution led to the reduction of skills individuals possessed due to an increase in technology.
2. Individuals looked to not exceed their maximum efforts whilst management have to try and get the maximum effort, or more, from an individual.	6. To try and control the behaviour of the workers the factory was considered as a place where standards that employers stated were necessary would be learnt. Fines and other methods were introduced as control mechanisms.
3. During the 1760s to the late 1870s in England, it was documented that workers would use surplus money to spend at their leisure instead of working regularly even though measures were created to	7. The introduction of scientific management was aimed at increasing productivity. To do this organising the factory, using cost accounting, supervision, and implementing jobs

The 'Worker' Sought the Initiative	The Management of an Organisation Sought the Initiative
stop such behaviour.	described as dull was necessary. The principle of scientific management relates to identifying an action. Once this action was identified, the remaining parts of the activity were removed, thus making the job more explicit which in effect could remove workers know-how.
4. Trade unions were formed that tried to limit the number of hours worked, trying to keep individuals within work whilst keeping the level of pay consistent. At the same time however, individuals sought to preserve their 'body'.	8. Through the work of Taylor to increase work practices and output, technology was an obvious replacement. However, with mass production if technologies could not replace an individual it was used in conjunction with an individual. Introducing the individual to a job that does not require a large amount of effort, it can reduce the amount of talent an organisation can possess and reduce the opportunity to accumulate knowledge.

Table 2.1

*A Concise Review of the Individual at Work*

Adapted From: Zuboff (1988)

Table 2.1 has been designed in conjunction with Figure 2.2 to show how throughout the history of work, there has been a battle to seize the initiative between the 'worker' and 'the organisation' (or more precisely the managers or owners of an organisation). When work could only be performed through an individual, or group of individuals, by using their 'bodies' (Zuboff, 1988) or by using specific skills (i.e., making glass), the 'individual' was essentially in control of the work process (see points 1, 2 and 3 of Table 2.1). With the industrial revolution and the rise of technologies, managers were able to take some control back (see points 5 and 6 of Table 2.1) and hence learning was lost. In response to the industrial revolution and the rise of technologies, trade unions were formed to aid individuals, whilst at the same time the individuals were considered to preserve themselves (Point 4) (Zuboff, 1988). Managers and owners used scientific management as a way to measure and record how a task could be reduced, even at the expense of making the individuals' work boring and monotonous, as well as reducing learning opportunities available (Point 7) (Zuboff, 1988). As newer technologies became available, they were seen either as a replacement for, or used in conjunction with an individual (Point 8) (Zuboff, 1988). At the same time,



individuals were not invited to participate in the implementation of new technologies. The paradox for an organisation was that for specific jobs, specific skills were required and needed individuals to learn – which meant the cost of replacing an individual increased (Ackoff, 1981). These points are argued as being related to learning: in IS design and implementation this is still not being paid enough attention. It is these learning issues that management try and control, which in turn makes learning a difficult aspect within organisations. The phases discussed by Zuboff (1988), and interpreted here, can be seen in Figure 2.2.

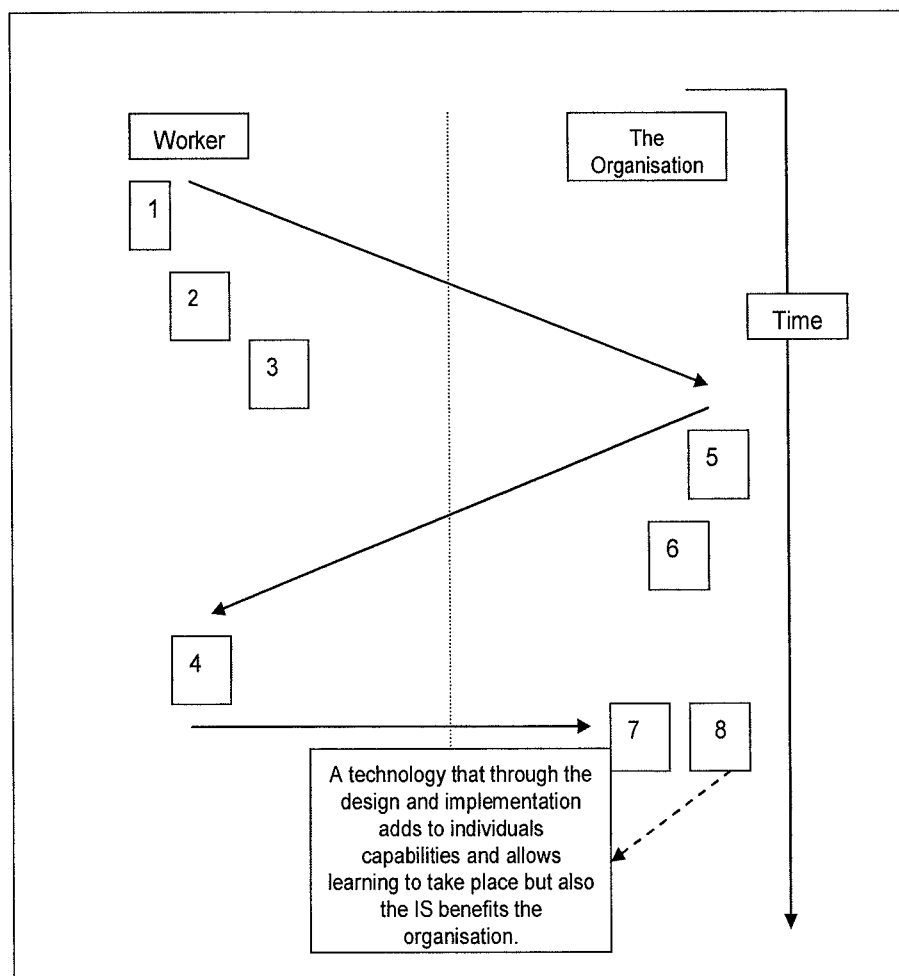


Figure 2.2  
*The History of the Worker*  
 Adapted From: Zuboff (1988)

Through the work of Zuboff (1988), Table 2.1 and Figure 2.2 demonstrates the conflict that has presented itself throughout the history of work between the individual worker, and senior individuals within the organisation. It is important to note the dotted arrow at the bottom of Figure 2.2. The arrow represents one possible future of

IS. The use of some ISA can be classed as a labour or cost saving device (e.g., Avison and Wood-Harper, 1990; Dewett and Jones, 2001; Johannessen, 1994). Management may also use ISA as a tool for the measurement of productivity levels (see Earl, 1987; McKersie and Walton, 1991; Pentland, 1994), or as Osterman (1991) argues, a Tayloristic approach to removing knowledge. If this is the case, it provides an individual with little chance of enhancing their skills and learning through the design and implementation process as the problem has been fixed, and taken as given.

Through factors such as design and implementation that need to be undertaken within an organisation, opportunities are being missed to design and implement IS that can help individuals to learn throughout the process and provide other individuals within organisations with a suitable ISA. These issues can complement the technology used for measurement requirements and remove the Tayloristic principles of modern day work. If this task can be achieved, it may turn the dotted line of Figure 2.2 into a solid line, as we move forward through time to an area where both individuals and management are relatively happy with the way work is conducted and in particular, how IS projects are undertaken. This may allow employees to undertake their tasks with more freedom as well as find better ways to undertake these tasks (Dewett and Jones, 2001). One area that may help individuals design and implement IS with a greater focus on the learning the approach can incorporate comes from systems thinking.

## **2.2 Systems Thinking as a Way Individuals within Organisations can Investigate and Help Design Information Systems**

To discuss, investigate, and design and implement technologies, the area of systems thinking can be considered to help individuals within an organisation. As systems' thinking is just one of a number of ways of thinking about IS, it is not being argued as the correct way, but only that it could prove helpful. Bell (1996) believes that the task of collecting data and other information about complex situations without a suitable method is impossible. Systems thinking is considered as a 'method' for undertaking this task. This may not be as simple as it sounds. Two brief reasons why are now acknowledged as an introduction to this area. Firstly, there has not been any set theory which can be used to help with designing and discussing IS, even though the concept of systems thinking is argued to be relevant to the area of IS, and is often

assumed to be used (Avgerou, 2000; Checkland, 1999; Lewis, 1994). Systems thinking does not hold all the answers to the relatively new field of IS (Jackson, 1997) as understanding of ISA implementation is still lacking (Kwon and Zmud, 1987). Secondly, the term 'system', as used by many people is taken to physically exist; however, the term 'system' actually only exists in concept, which may or may not be helpful in making sense of the 'whole' (Checkland, 1999).

Checkland and Scholes (1990 p18) go on to explore the term 'systemic' to "*be 'of or concerning a system as a whole.'*" As a result, systems thinking can be encountered as a process of organising a collection of thoughts which can make use of the concept (Checkland and Scholes, 1990). Checkland and Scholes (1990 p18-19) state the concept can best be described as "*a complex whole may have properties which refer to the whole and are meaningless in terms of parts which make up the whole.*" Within the area of systems thinking, the subject has been divided up into hard and soft systems approaches. A description upon what each of these areas philosophically holds is left to Lewis (1994).

*"The hard systems approaches use the concept of a 'system' ontologically, that is to say, as a label for things in the real-world, and analysis proceeds on the basis that the world is composed of systems and sub-systems. Soft systems thinking however emphasises that the concept of 'system' is an epistemological device for thinking about some part of the world rather than an ontological description of part of the world. Whilst a very powerful tool for analysis, the notions of system and sub-system are only mental constructs through which we may choose to make sense of an external world"* (Lewis, 1994 p35 underlined words are the emphasis in original source).

An example of the 'hard' and 'soft' areas of practice can be given by Avison and Fitzgerald (1995). Hard systems thinking relates to solving goals in the most effective manner, whilst soft systems thinking sees the problem as more than just a goal that can easily be solved (Avison and Fitzgerald, 1995). A continuing issue within the area of systems thinking is put forward by Jackson (1997) as the constant debates between soft systems thinkers towards hard systems thinkers and cyberneticians, with critical systems thinkers debating soft systems thinking, and so on. Bell (1996) gives

an alternative perspective by reviewing three approaches to investigate 'systems' and while not by his admission definitive, they offer an approach of moving from the 'soft' to the 'hard'. The soft approach regards a system "*as an abstract perception and model relevant to reality*"; the structured approach as a system as "*a closed and discrete unit of study*"; and the functional approach which considers a system as "*independent, integrated variables*" (Bell, 1996 p24). It is these descriptions upon the soft approach to systems thinking that can be very useful in helping to design, implement, and manage ISA with an emphasis on learning. The remainder of this section will explore why.

If systems thinking is understood, many of the ambiguities (Checkland, 1999) that IS present to individuals and managers may be removed. The question can be raised as to why ISD is not undertaken in this way, and why systems thinking is argued as being suitable when other methods of examining problems are available. An answer to this problem comes from Lewis (1994). The reductionist approach splits the area under investigation into more manageable domains which can then be examined in turn; hence, taking account of the problem as many small problems that once solved will effectively solve the overall problem (Lewis, 1994). But by undertaking the task in this way, it may not allow the interaction of the areas under investigation to be seen, which can be as important as the problem (Lewis, 1994; Open University, 2002). Or in summary, if the whole IS or MIS is regarded in isolation they may show different characteristics than when they are examined together (Checkland, 1993<sup>2</sup>; Open University, 2002). Ackoff (1981) points to this thinking as revising the thinking of the machine age of decomposition, explanation, and explaining the whole.

Wilson (1984) states that in forming a definition of a 'system' you can look in a dictionary. Wilson (1984 p20) quotes<sup>3</sup> "*a system is a structured set of objectives and/or attributes together with the relationships between them.*" Wilson (1984 p20) continues by adding that a system can relate to "*a procedure, a process or its control, a network, or a computer-based data processing package.*" It is important to highlight that these particular systems, in contrast to natural systems, are referred to as

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<sup>2</sup> This work references Checkland 1993 as opposed to the original 1981 reference of Systems Thinking, Systems Practice as the university library only carried a 1993 reprint of this book.

<sup>3</sup> Wilson (1984) does not state the dictionary the definition was taken from.

human activity systems (HAS) (Checkland, 1993; Checkland and Holwell, 1998; Lewis, 1994; Wilson, 1984). From this definition, Wilson (1984) has constructed a model of a 'system' as shown in Figure 2.3.

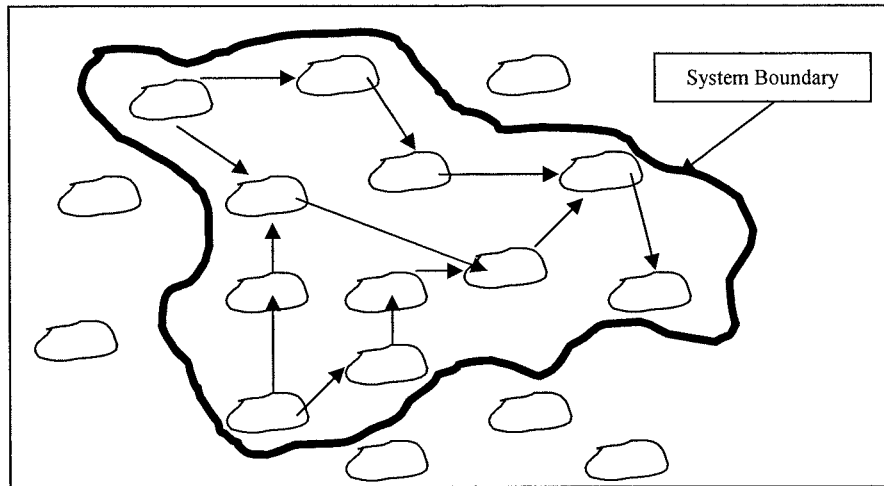


Figure 2.3  
A Model of a System  
Source: Wilson (1984 P21)

Wilson (1984) describes Figure 2.3 as a set of elements that are taken together whilst other elements are excluded. Or more descriptively, Figure 2.3 can be described as examining how the parts are connected within the whole rather than on just each part in isolation (Ackoff, 1981; Open University, 2002; Wilson, 1984). Figure 2.3 is also trying to show that the 'system' is "*a set of components interconnected for a purpose*" (Open University, 2002 p40). Ackoff (1981) continues by stating that a system does not relate to a system if the parts all do the same thing; for a system, all parts must have a function. As an example, when encountering an ISD project, once the technology has been implemented it may be classed as the whole 'system' to some stakeholders, but to others the 'system' may incorporate other events, e.g., information required (Avison and Wood-Harper, 1990).

Figure 2.3 also demonstrates the set of elements as falling within a boundary. A boundary is required as a way to capture the relationship between the parts by separating the parts from the environment (Open University, 2002). Stowell and West (1994) state that how a boundary is identified relates to how well the problem situation can be understood. A boundary should only be drawn when it can be agreed

what constraints will be applied to the investigation, hence the boundary is eventually drawn (Stowell and West, 1994).

Once the boundary has been drawn participants can then examine a 'system' of interest (an IS for instance) (Lewis, 1994; Open University, 2002). By drawing a boundary, it allows an analysis to be undertaken in a holistic way, focusing not only upon an individual aspect which is an important point of the problem but what the relationship is between the different parts (Lewis, 1994; Open University, 2002). Stowell and West (1994 p16) agree as they state "*...a system, to 'systems thinkers', has a very particular meaning which involves a description of some collection of parts which, when connected together in a specific way, can be said to bring about some purposeful activity.*" Figure 2.3 could have been modelled differently. By modelling the activities differently, or altering the boundary, a different perspective may be revealed (Lewis, 1994; Stowell and West, 1994). This can then be discussed *which* might provide new insights.

Figure 2.3 is trying to demonstrate that systems thinking is an attempt to investigate the concept of '*the adaptive whole*' (Checkland, 1999 p49; Stowell and West, 1994; Wilson, 1984). Checkland's (1999) argument relates to using systems thinking to relate to a specific context, which allows individuals to understand their world and take any actions they wish relating to this context. Wilson (1984) provides an example of an individual who is trying to improve production performance. There are no clues as to what to investigate or how changes can be introduced (Wilson, 1984). These types of problems can be described as unstructured or soft problem areas, which ask the 'what' and 'how' types of questions (Rose, 2002; Wilson, 1984). If this argument is applied to individuals' developing or using IS, it may provide a different insight compared to traditional methods of designing and implementing and using ISA – in relation to what to actually design, and how to implement and use it. By incorporating this type of thinking, which, it has been argued, can provide an element of learning within an ISD project, it is proposed that systems thinking is incorporated in any soft methodologies that this work could use to help embed and generate learning activities argued as being required in an ISD project. This argument is further strengthened in the next section which considers the problems that individuals within organisations encounter with IS, and the current design and implementation methods for IS.

### 2.3 The Problems Individuals within Organisations may encounter with Information Systems

Lewis (1994) argues that an understanding of how information can be managed and used is very important. He continues by citing the fast changing area of information systems, beyond the rate that people who are responsible for it could have imagined. Ackoff (1967) believes five mistaken issues occur when individuals design, in his terms, management information systems (MIS). These issues as stated by Ackoff (1967 B147) include:

- *The critical deficiencies under which most managers operate are a lack of relevant information.*
- *The manager needs the information he wants.*
- *If a manager has the information he needs his decision making will improve.*
- *Better communication between managers improves organisational performance.*
- *A manager does not have to understand how the information system works, only how to use it.*

Much has been written about Ackoff's (1967) article and as a consequence will not be reviewed here. What is important to note is that this article was written in 1967 and these problems still persist today. Learning, or a lack of it, could be argued as a key factor in why these mistaken issues still persist in ISD projects today. To add to this problem, designing and implementing IS will affect many people, as they have the potential to affect all parts of an organisation (Vidgen, 1997). The five mistaken issues Ackoff (1967) discusses can be encountered by many more individuals than just managers and other senior personnel, making designing suitable IS more difficult, as more individuals may hold these beliefs without investigating the issues. From these issues it can be stated any process used to design and implement an ISA has to overcome such problems. This may not be so easy.

Many different forms of IS have been categorised (Decision Support Systems, Executive Information Systems, and Database Management systems for example) and researched. The review of management information systems (MIS) has led to

disappointments especially when trying to solve complex problems that individuals within an organisation could face (Argyris, 1999). Argyris and Schön (1978) as well as Argyris (1999), state that eight reasons have contributed to the disappointments, including issues similar to Ackoff (1967):

- MIS were not understood;
- Senior personnel were not involved in the MIS process;
- MIS is not perfect;
- MIS is too complex;
- MIS personnel do not understand end users’ jobs;
- MIS ignores learning styles;
- MIS was not implemented correctly and
- MIS is not designed with humans in mind.

The promises of MIS as providing data for learning are already considerably reduced if Argyris’s (1999) categories hold true. Lewis (1994) supports this issue as he believes that you can not create information systems for one individual group within an organisation; you have to link with other information systems that can share the same data. These problems may be regarded to relate to the ‘hard’ thinking applied to IS, compared with the ‘soft’ approach (Checkland and Holwell, 1998), which is considered to deal with such issues. To represent the problems through an illustration, the work of Lubbe and Remenyi (1999) can be used through Figure 2.4. Figure 2.4 was constructed through a traditional perspective that was encountered through Lubbe and Remenyi’s (1999) primary research.



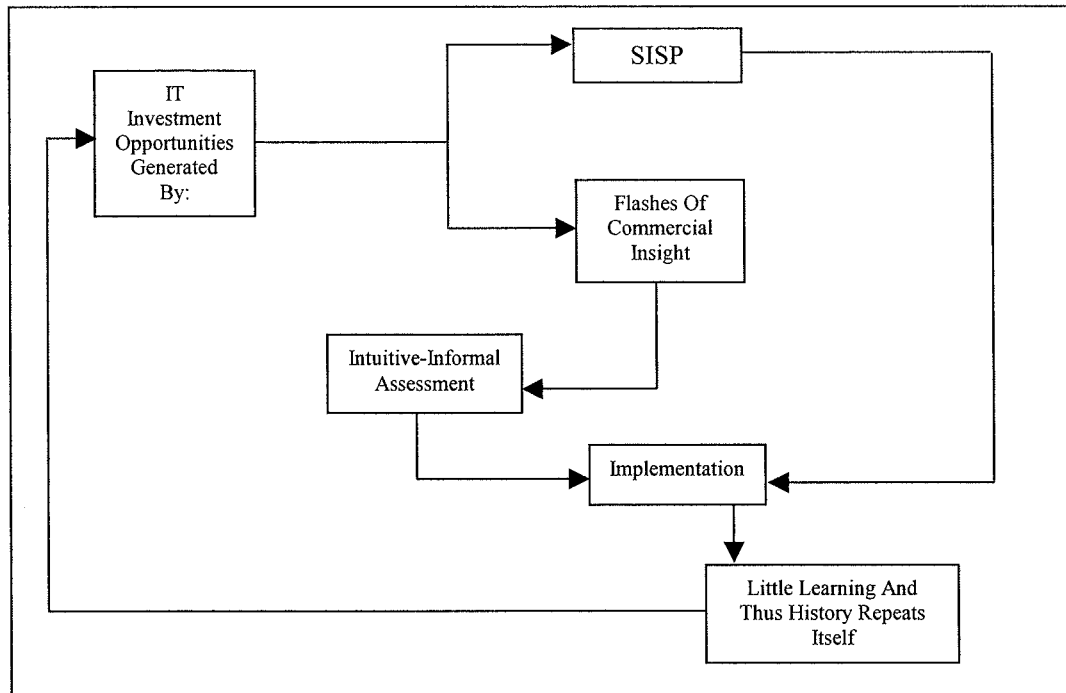


Figure 2.4

*A Traditional Perspective of IT Investment Process in Organisations*

Source: Lubbe and Remenyi (1999 P149)

Figure 2.4 has a close synergy to the problems Argyris (1999) has stated. Firstly, the strategic information systems planning process (SISP) may be used to select technology investments (Lubbe and Remenyi, 1999). Most investments however, came from 'flashes of commercial insight' and did not follow any formal process (Lubbe and Remenyi, 1999). Ormerod (1995) agrees, as he discusses at the start of any strategy program; help can be sought through a variety of tools and frameworks. There is more of a chance a choice will be made through previous experience: the particular setting, other business needs, and requirements of powerful individuals (Ormerod, 1995). These flashes of commercial insight do not address the important issues that ISD should focus upon. The flashes of commercial insight may only solve the time pressures that decision makers who are responsible for selection of IS investments have to make.

If these factors apply to most individuals within organisations it is not hard to see why Ackoff (1967) and Argyris's (1999) reasons for disappointment from MIS can be stated. One way to combat this problem may be a continuous evaluation programme once the technology has been decided upon and implemented (Remenyi and Sherwood-Smith, 1999). This evaluation programme can be driven by top

management but is primarily used by the end users of the technology, thus ensuring that both the performance of the business and the needs of the users are met (Remenyi and Sherwood-Smith, 1999). Learning could also be a factor in this process but going back to Lubbe and Remenyi's (1999) model, a way to remove the 'flashes of commercial insight' needs to be investigated. This comes from identifying how ISA can be designed and implemented.

## 2.4 Information Systems Development

Lyytinen (1987 p6 original emphasis) defines IS development as “...*a change process taken with respect to object systems in a set of environments by a development group to achieve or maintain some objectives.*” Whilst not specific, Lyytinen (1987) argues the definition is general enough to see the important aspects information systems development (ISD) involves. It is believed that a project involving ISD has just to state a change process, an object system that requires change, identify the environment the change will affect and that it needs to take place; state the individuals who will make up the development group, and state a set of objectives the IS will need to meet. This is not as simple as it sounds. Lewis (1994) argues that in order to create ISA, an understanding of how individuals perceive their world is required. Russell and Hoag (2004) agree as they emphasise the main problems with ISA design and implementation do not relate to technology, but to the human aspect. The individuals of the organisation may not be clear on the type of IS required; whilst the individuals who will build the technology are left with a lot of scope, to build what they think will meet the needs of the organisation (Currie, 1995). This ambiguous situation does not provide the individuals of an organisation with the required ISA, and enforces the use of 'flashes of commercial insight' as a more efficient way of selecting IS as seen in Figure 2.4.

Williams (1997 p189) discusses four areas to improve the planning of IS including:

- Identifying the strategic objectives.
- Identifying the information systems to support them.
- Analyse, in detail, the information systems requirements.
- Allocate resources and budgets to scheduled projects.

To satisfy these concerns, raised by Williams (1997), the use of a methodology that may address the concerns and many others could be used. Ackoff (1967) states five issues, to balance the five mistaken issues, which organisations need to take account of to design MIS's more effectively. These include analysing the decision system, an analysis of information requirements, aggregating decisions, the design of information processing and designing the control of the control system (Ackoff, 1967). Again, these issues will not be dealt with in this work but readers are referred to Ackoff's (1967) work for a description. What is important to note is how, if at all, individuals within the organisation can address these issues. Ackoff (1967) believes that these five points need to be addressed in association with information specialists, operations researchers, as well as managers. Participation could be argued as a necessary if Ackoff's (1967) work is taken. How this participation could be achieved may require the use of an IS methodology or framework. Ciborra (1999) also notes the use of methodologies to develop and integrate IS by individuals on behalf of an organisation. It is the opinion that a soft methodology could be used as a way to design IS; especially with an emphasis on learning if they can take into account the problem areas that Ackoff (1967) and Argyris (1999) have discussed. With an increasing number of methodologies and frameworks being available, selecting a suitable methodology can become a problem within itself. The next section discusses a number of methodologies, and presents the advantages for and against using the particular methodology.

#### **2.4.1 Information Systems Development using Methodologies**

It was noted in the last section, and through the work of Lyytinen (1987), that an ISD project has to tackle a number of issues. How an ISA is designed and implemented is important. If an ISA is to be brought into an organisation, action has to be taken to accomplish this goal, which is undertaken through individuals who are part of an organisation (Checkland and Holwell, 1998). An exploration has to be undertaken that will bring with it debate as to which technology is required to support the needs of these individuals. In order to do this successfully, the method (methodology) used needs to generate appropriate meaning and purpose of any action undertaken (Checkland and Holwell, 1998).

Where problems are concerned for individuals within organisations, Ackoff (1981) believes they can be treated in three ways: namely, resolve, solve, or dissolve the problem. Whilst Ackoff (1981) refers to problems in general, it is argued that it also can apply to using ISA to treat problems. To resolve a problem requires the solution of a process that is good enough, or just satisfies the problem (Ackoff, 1981). It is stated that most managers resolve problems using qualitative issues, common sense, and judgements (Ackoff, 1981). This could relate to implementing an ISA because it was a cost effective purchase, or through issues that Lubbe and Remenyi (1999) refer to as 'flashes of commercial insight'. On solving a problem, Ackoff (1981) perceives the selection of a process that will produce the best outcome.

Solving a problem is argued to be based on the use of mathematical and other scientific methods (Ackoff, 1981). This problem is used mainly by technological managers and other management scientists (Ackoff, 1981). From this perspective, the individuals who utilise this problem approach may not be the ones that have the say on what technology will be designed and implemented with ISA being designed to resolve problems only.

The final problem category is to dissolve a problem. To dissolve a problem is to alter the problem through changing the problem, or the environment the problem occupies so that in the end the problem is removed (Ackoff, 1981). Individuals who undertake this method use a variety of tools that the other two approaches utilise, but use them 'synthetically', instead of just analysing the problem (Ackoff, 1981). This last issue (dissolve) is argued to be the most suitable to adopt when designing and implementing an ISA, if it is hoped that learning activities are to be generated. This will now be discussed. Firstly, if a problem has been identified and dissolved, it means the problem has been removed; as compared to being resolved or solved, and still in existence. Designing and implementing an ISA to dissolve a problem will be more effective than only solving a problem. For this, an approach that promotes learning is necessary. Secondly, in dissolving a problem, the tools that will be used need to be used synthetically. It is this form of thinking that is an aspect of systems thinking. A methodology may be used to combine this problem dissolving aspect in association with systems thinking. Any methodology used can relate to an epistemology that the framework draws upon throughout the design and

implementation (Avison et al., 1998), and which takes on board the problem solving issues to which Ackoff (1981) refers.

This section gives an overview and discussion in the area of methodologies that could be used or refined further, to help with the design and implementation aspect that could generate learning benefits. Before this overview is undertaken, it is worth bearing in mind two problems that are very important when related to designing, implementing, and using technologies. The first problem that can occur with ISA design and implementation involves the many individuals and the different perspectives that they can adopt about the project. Or as Avison and Wood-Harper (1995 p103) state, when referring to selecting a methodology, “*different methodologies represent different views of the world.*” If one individual dominates, the technology will be developed from this perception, while other people may want to present a different perspective. The second problem is identified through Wilson (1984) when he argues activities within an organisation are worked on by individuals who may be labelled ‘users’, whilst departments such as data processing work upon design issues. The resulting information system that has been designed does not meet the requirements of the user (Argyris, 1999; Wilson, 1984) with modification to the technology afterwards being expensive (Mumford, 1987). Reasons for this can relate to incorrect specifications and requirements; the design team implementing what they thought would be best, or the area that the technology is to be used within the organisation is not considered (Bell, 1996; Wilson, 1984). A learning approach that involves all these stakeholders may restrict such problems in the future.

Stowell and West (1994), in acknowledging these problems, considered client led design. Client led design has been developed as a framework as opposed to a methodology for information system developments (Stowell, 2000). On discussing client led design, Stowell and West (1994 p25) state that IS “*are better defined by the individual or group within the client organisation that has some reason to view a particular set of data as information.*” Mumford (1997) supports this when she asks the question of why is participation not very popular – especially in IS design. Mumford (1997) is not alone, as Buchanan and Gibb (1998) investigated implementation issues of ISA and noted a lack of involvement from end users in most aspects of the process.

With the issues discussed, it may be considered finding a participative methodology is an easy task. The selection of a methodology is more than just selecting appropriate methods to undertake the development (Avison and Wood-Harper, 1990; Russo and Stolterman, 2000; Wilson, 1984); it can relate to a different philosophical position. With this thinking, a methodology needs to be flexible, with relation to the structure and how the methodology is applied (Wilson, 1984). Taking this thought implies that the person using the methodology comprehends the purpose that methods are used for in a particular instance; but different philosophical positions can make selecting the most applicable methodology for all stakeholders involved impossible (Avison and Wood-Harper, 1990; Vidgen, 1997). Rose (2002) believes most methodologies are derived from the view of humans as being goal seeking, with only a few offering alternative perspectives. West (2002) does offer one alternative approach through the work of Vickers and his concept of relationship-maintaining; however, methodologies incorporating these perspectives seem also not to be favoured. How the individuals who make up an organisation are perceived and how an organisation overall is perceived may relate to the selection of a methodology. Nevertheless, what methodologies are available and used should be considered before identifying what is considered the softer methodologies that this work is looking for.

#### 2.4.2 Information Systems Development Methodologies

As a starting point for this review, Stowell and West (1994), in their book discussing client led design, display a table (Table 2.2 below) showing the history of design methods for computer systems expanded from Stowell's (1991) original table.

Year	Method	Feature	Activity
1969	Traditional (e.g. NCC)	Systems life cycle	Data definition and technical specification
1979	Structured systems analysis	Logical model of processes	Data flow of overall system
1979	Participative approach	Consultative, representative consensus participation	Design of human and technical part of computer system
1979	Information engineering	Normalised logical data structure	Data definition
1981	Information engineering	Strategic planning of information system	
1981	Jackson system development	Production of maintainable systems	Modelling of entity life histories as

Year	Method	Feature	Activity
			sequential processes
1983	Prototyping	Client and analyst develop a 'system' model using prototyping software	Client involvement in data definition
1989	Information systems engineering	Creation of a data dictionary/encyclopaedia	Analysis of company strategy in data terms as the basis for information engineering workbench
1984-90	Structured systems analysis and design method	Data and process modelling	Data analysis, definition and technical specification
1985-90	Multiview	Computer system development as a hybrid process	Rationalisation of client views as the basis of data definition
1991	Object-oriented analysis	Software systems as cooperating objects	Examines requirements from perspective of the classes of objects found in the vocabulary of the problem domain (Booch, 1991)

Table 2.2

*The History of Computer Systems Design Methods*

Source: Stowell and West (1994 P8)

Table 2.2 displays a history of computer systems design methods. It should be noted that the earlier methodologies were developed from the waterfall approach (i.e., the traditional systems life cycle) to ISD, where stages, rules, and procedures were incorporated into an approach (Avison and Fitzgerald, 1999). These methodologies were identified as having weaknesses, but were still incorporated into methodologies of the 1980s. What is important to note is that all of the approaches above do not state the difference between what can be described as a computer/data system, and an information system, as the two seem to be synonymous (Stowell and West, 1994). Stowell (1991) as well as Stowell and West (1994) criticise the methodologies in Table 2.2 for mainly focusing upon the technological aspect, while neglecting to address the actual problem area. Newer approaches have been developed (see Table 2.2); however, these newer approaches “*have not threatened its credibility*” (Lewis, 1994 p 74) of the systems life cycle and are seen to be accepted by designers,

developers and users (Mumford and Weir, 1979). The approaches based on the systems life cycle can be criticised as not incorporating a learning approach to IS design and implementation. This problem is further highlighted through Avison and Fitzgerald (1995). In their book on information systems development, Avison and Fitzgerald (1995) list 14 methodologies that can be used to develop an information system. A summary of these methodologies that draws heavily on the work of Avison and Fitzgerald (1995) can be seen in Table A.1 Appendix A and seem to be based on the systems life cycle.

Based on the reviews given by Avison and Fitzgerald (1995), Table A.1 (Appendix A) provides a concise, although brief, debate of a few selected methodologies that individuals within organisations could use to design and implement ISA. The problem with a number of these methodologies is that they lean heavily towards the experience of skilled technical individuals (Avison and Fitzgerald, 1999). Using only skilled technical individuals can restrict the participation of non-technical individuals as well as incorporating the principles of the systems life cycle (Avison and Fitzgerald, 1999). This could imply technical specialists will select the methodology they perceive is most suitable, without other methodologies being included. Barki and Hartwick (1994) agree as they state that information systems staff may take account of operations, which tackles the more technical issues, management may consider the organisation and its goals, whilst users may only want to examine how the technology can be used. An approach that allows all these individuals to raise their particular issues may be required.

Jackson (1997) states that to design and implement ISA, any individual has to develop an understanding, or appreciation, of the characteristics of the 'system' the IS needs to be developed for. The methodologies however, were discussed within Appendix A, Table A.1 as being unsuitable for this issue for a number of reasons including: taking a reductionist approach to ISD, focusing on specific issues of the development while neglecting others, and being too structured not allowing the flexibility that may be required when tackling specific projects and issues. Mingers (1995) and Stowell (1995) agree when they highlight the current failures relating to ISD as being attributed to the use of 'hard' methodologies. Due to the 'subjective nature' of ISA, and the envisioned information they will provide, it is argued that any methodology



needs to provide a description of the situation that is rich in nature (Stowell, 1995; Stowell and West, 1994). A process of exploring and learning in conjunction with both the participants who will use the technology and the specialists who will develop it (Stowell, 1995; Stowell and West, 1994) also needs to be incorporated.

A number of methodologies do demonstrate some approaches that provide a rich description, as well as requiring the participation of both individuals and computer specialists. These points include the participation of potential users and managers as argued for by Stowell and West (1994), as well as only implementing an ISA if the problem so requires a technology solution. This issue is important as they can state aspects that will improve their jobs; add to each individual's ability within an organisation. Adding to individuals' abilities could hopefully improve an organisation, and allow individuals to learn from the experience undertaken, as well as the end technology being able to allow individuals to generate learning activities. Other possibilities include adopting a framework approach, as opposed to a precise methodology that has to be followed rigorously. Whilst the methodologies summarised in the appendix (see Appendix A) may not offer all of the characteristics argued as being important, Avison and Fitzgerald (1995) also discuss three that might. These three methodologies are also considered as being more 'soft' in nature and could provide value in this research. These are listed as ETHICS, Soft Systems Methodology (SSM), and Multiview.

#### **2.4.3 ETHICS**

In line with the acronym, effective technical and human implementation of computer-based systems (ETHICS), the approach focuses upon the ethical issues involved with ISD (Avison and Fitzgerald, 1995). ETHICS has been developed through two main issues. These issues relate to the flexibility that technology offers to check the satisfaction individuals can receive through their work; and secondly, jobs could still be altered after the implementation of a technology to achieve this job satisfaction (Mumford and Weir, 1979). In order for this to be achieved, participants need to investigate and learn what criteria can relate to job satisfaction and how a technology could help improve job satisfaction. Mumford (1995) states that ETHICS has three objectives, with reference to change: firstly, all individuals who will use the 'system' can help with the design of it, secondly, as well as constructing technical and other

operational functions, users can set job satisfaction functions as well, and thirdly to make sure that the ISA designed is compatible with the organisation. Whilst these issues are all important, they relate to the management of change which is one aspect of an IS project. ETHICS however, still may not be a suitable approach for this work if the learning element is not of prime concern.

Avison and Fitzgerald (1995) regard ETHICS as being different to other methodologies, due to the clear philosophical statements that Mumford (1995) makes, as well as the participation aspect. Mumford (1995) summarises participation by stating that the conflicts of interest that arise through any change taking place within an organisation as needing to be resolved. This could represent an opportunity to learn about such conflicts and take this learning forward. To resolve these conflicts, they firstly need to be identified and brought forward and debated. Through this format, debate allows for participation which provides a place where the interests of all individuals (employees and managers) can be represented equally (Mumford, 1995). As well as stating a philosophy and placing an emphasis upon participation, ETHICS is also based upon socio-technical approaches that have been used within the social sciences (Avison and Fitzgerald, 1995). This position is argued to be more suitable due to the nature of viewing and solving problems only in technical terms (Mumford and Weir, 1979). This approach is different to the traditional life cycle methodologies developed, but it needs to be discussed if ETHICS could be suitable for this work.

ETHICS is founded on socio-technical design which requires the 'ethics' of the approach to be made clear to all (Mumford, 1996). Socio-technical issues see the individual and technology interaction in an attempt to produce 'systems' that are not only efficient from a technological perspective, but also allow an individual to receive high job satisfaction (Mumford, 1995). It is this investigation into the individual and technology interaction investigation which can provide learning opportunities. During a review of the history of work through Zuboff (1988), the thinking on accommodating the individual and technology interaction was argued for and was considered to achieve a middle ground that allowed effectiveness of technologies, with the ability for individuals to improve and achieve further learning. This further

learning or job satisfaction, however, focuses on the management of change and less on the design and implementation of ISA.

Avison and Fitzgerald (1995) draw on the work of Mumford and Weir (1979) to describe what job satisfaction is. Mumford and Weir (1979) argue that defining exactly what job satisfaction is can be difficult, and so adopt their own definition. Job satisfaction, according to Mumford and Weir (1979), relates to attaining a good fit from what an individual hopes to get from their work (as in personal requirements for example) and what requirements are placed upon the individual by the organisation. To investigate this fit, an instrument has been developed for measuring job satisfaction for ETHICS based upon various perspectives (Avison and Fitzgerald, 1995). So ultimately, the solution selected will be the one that meets the human as well as technical aspects best (Mumford and Weir, 1979). These perspectives can be seen in Table 2.3.

	<b>The employee's job needs</b>	<b>The employee's job experience</b>
	The employee:	A good 'fit' exists when he:
The Knowledge 'fit'	Wishes the skills and knowledge he brings with him to be used and developed.	Believes that his skills and knowledge are being used and developed to the extent he wishes.
The Psychological 'fit'	Seeks to further interests private to himself e.g. secure: achievement, recognition, responsibility, advancement, status.	Believes that his personal interests are being successfully catered for.
The Efficiency 'fit'	Seeks a personal equitable effort-reward bargain, and controls, including supervisory ones, which he perceives as acceptable. Seeks efficient support services such as information, supervisory help.	Believes that financial rewards are fair and other control systems acceptable. Believes that he receives the support services he requires to do a competent job.
The Task-Structure 'fit'	Seeks a set of tasks, which meets his requirements for task differentiation, e.g. which incorporate variety, interest, targets, feedback, task identity, and autonomy.	Has a set of tasks and duties, which meet his needs for task differentiation.
The Ethical (social-	Seeks to work for an	Believes that the philosophy

	<b>The employee's job needs</b>	<b>The employee's job experience</b>
value) 'fit'	employer whose values do not contravene his own.	and values of his employer do not contravene his own values.

Table 2.3

*Five Areas of Job Satisfaction Measurement*

Source: Mumford and Weir (1979 P17)

Table 2.3 gives an overview of the five areas of job satisfaction measurement. For a more detailed discussion, see Mumford (1996 Chapter Three) when referring to ETHICS. Avison and Fitzgerald (1995) state different sources have differing opinions about the number of the particular stage as well as the names of the stages. The discrepancies may make the approach difficult to learn and adopt for a project if the issues are not clear. Avison and Fitzgerald (1995) review the fifteen-step version, which is summarised after the initial methodologies in Appendix A (Table A.2). By investigating the numerous areas of job satisfaction through the instrument is considered the prime learning aspect that ETHICS offers. Whilst this may be argued to have the potential in producing the learning hoped for within a soft methodology, the approach does also present a number of drawbacks also.

Avison and Fitzgerald (1995) highlight the criticisms that ETHICS faces by stating the impracticality of the approach. Arguments arise because individuals who will use the technology are not skilled in the area of design; as well as power issues relating to senior management having to give up their managing rights (Avison and Fitzgerald, 1995). In addition, ETHICS may be argued to increase development time, as well as increase costs (Mumford and Weir, 1979). However, as Stowell and West (1994) have argued above, individuals should have a role in defining their requirements. Mumford and Weir (1979) believe that not having the users involved can result in users resisting the new technology, as well as resisting change with a high proportion of individuals not attending work. It is this participation element which is an advantage within a methodology.

ETHICS is the type of methodology that this study is examining, but it is argued that the approach, even though focusing upon the participative element, may not be suitable. The unsuitability of the method relates to the number of stages the approach

defines. However, it can be argued that other methodologies contain a large number of stages and are still used. Mumford and Weir (1979) admit the process can take a long time to complete and have stated this time frame in years in some cases. Other issues include the by product of the ETHICS approach, focusing mainly on the social and technical issues which can provide elements of learning, but are not of prime importance of the methodology. Finally, ETHICS is seen to not question the objectives of ISD projects as the main focus is on investigating the gap between the social and the technical issues, and how best this can be bridged. Through focusing on this gap there is no questioning on why the project is required in the first place.

#### 2.4.4 Soft Systems Methodology

Soft Systems Methodology (SSM) has been described by Checkland and Scholes (1990 p1) as "*an organised way of tackling messy situations in the real world.*" Jackson (1997) adds SSM promotes subjective understandings from the individuals involved, so that they can shape a more suitable future. Whilst not an ISD methodology as such, much work has adapted SSM precisely for this purpose. Mingers (1995) also takes account of a number of different attempts to use SSM with other thinking and methods. Soft Systems Methodology is based on systems thinking which allows the use of a high level of definition as well as flexibility (Checkland and Scholes, 1990), which was argued for earlier as a useful approach for designing, implementing, and managing ISA. Soft Systems Methodology was developed in reply to the problems systems engineering methodologies ('hard' methodologies) produced (Checkland, 1995; Mingers, 1995; Shehata and Bowen, 2001).

Checkland and Scholes (1990) as well as Checkland and Holwell (1998), argue that the purpose of SSM is to investigate a problem that is highlighted as a concern, which then leads to the identification of any relevant human activity systems (HAS). These are then modelled and compared to the problem situation (the real world), debated, and then through the outcome of the debate, purposeful action to improve the area of concern is then selected. It is through such an approach as this that may provide an element of learning that this work is looking for. "*The advantages of SSM lie in its philosophy, not the mechanics – its emphasis on human activity systems, differing points of view and cultural feasibility*" (Ormerod, 1995 p88). The approach, as developed by Checkland (1993) and Checkland and Scholes (1990), is labelled as a

methodology but this may lead to confusion. Soft Systems Methodology may imply the process is a structured approach to solving problems, as it contains the word 'methodology'. As Avison and Fitzgerald (1999) point out, the term 'methodology' may only be agreed on at a general level, but implies a set of steps that are to be followed. This is not what SSM has been designed for, and will briefly be explored to investigate if SSM provides a suitable learning element.

Checkland (1993) investigated the approach of a methodology to help undertake what action is appropriate to a situation, compared to a philosophy. Checkland (1993 p162) states, "*where a technique tells you how and a philosophy tells you 'what', a methodology will contain elements of both 'what' and 'how'.*" Even though Checkland (1993), and Checkland and Scholes (1990) state the approach as Soft Systems Methodology, it is only to undertake the 'what' and 'how' processes along with incorporating systems thinking. This fact allows the methodology to be used on problems, but is not a precise formula to follow (Checkland, 1993; Checkland and Scholes, 1990). The methodology acts as a framework that could be used to investigate unstructured problems. This approach already seems more suitable than ETHICS (previously reviewed), even though the processes that ETHICS tries to identify are important and could play a role in this approach. The seven-stage SSM process can be seen in Figure 2.5.

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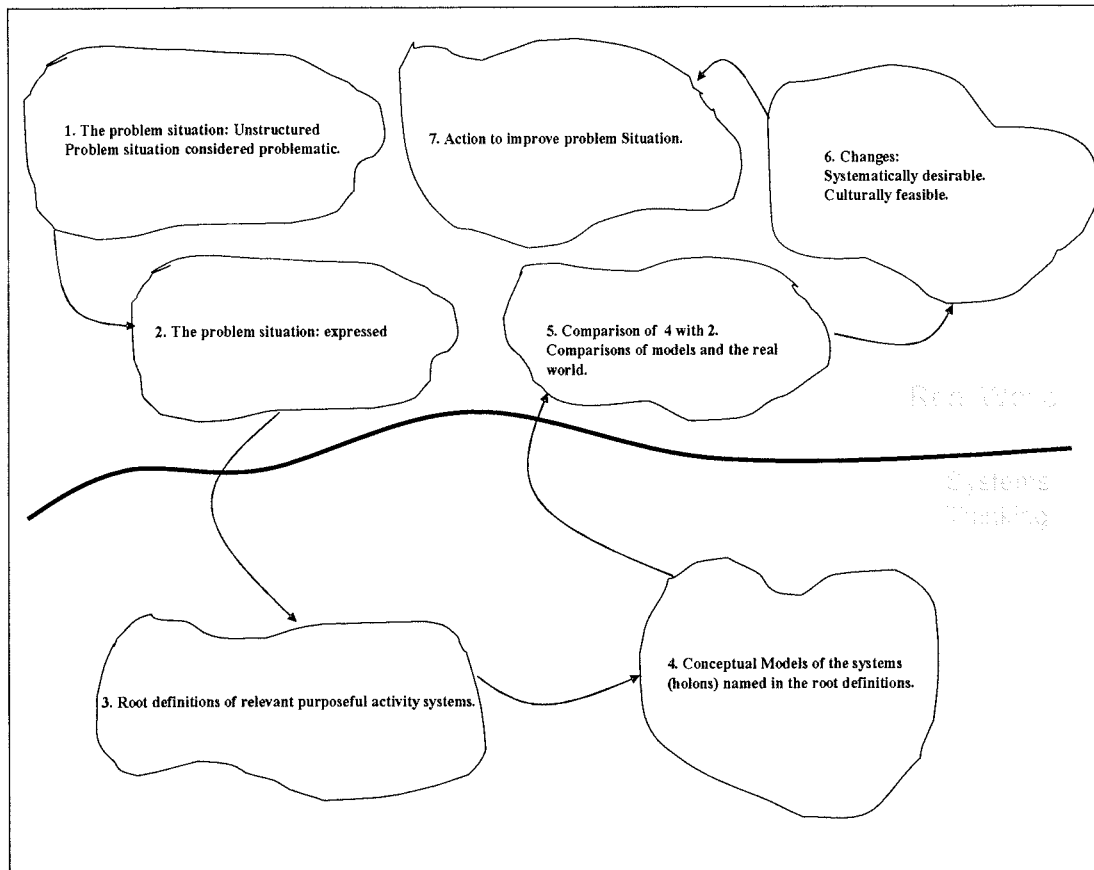


Figure 2.5  
*The Seven Stage SSM Process*  
 Source: Checkland and Scholes (1990 P27)

Figure 2.5 shows the traditional SSM approach that was developed in the 1970s, which according to Checkland and Scholes (1990) depicts a bare approach that implies a sequential seven-stage process to be undertaken. In their 1990 book, Checkland and Scholes (1990) portray a different version of SSM as shown in Figure 2.6.

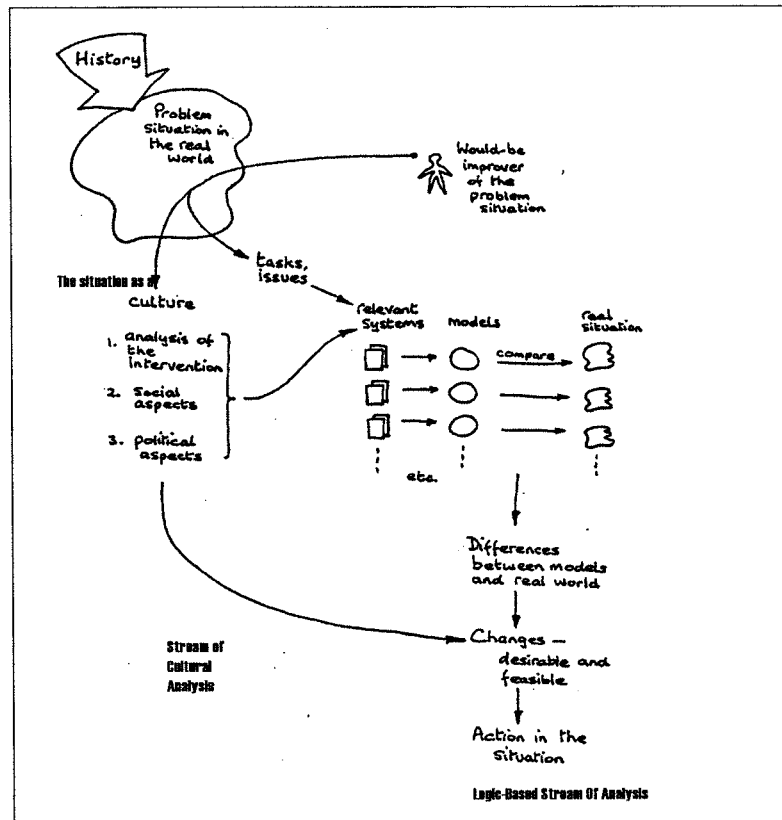


Figure 2.6

*The Process of SSM*Source: Checkland and Scholes (1990<sup>4</sup> P29)

It should be noted that even though Figure 2.5 and Figure 2.6 look different they share the same basic principles. Figure 2.6 has been developed to demonstrate that SSM is not just a seven stage process that has to be followed sequentially (Checkland, 1993, 1995; Shehata and Bowen, 2001; Wilson, 1984). Figure 2.6 is believed to describe SSM better due to the stream of cultural inquiry which may become lost after the first and second stage of Figure 2.5, when it is complete (Checkland and Holwell, 1998; Checkland and Scholes, 1990). Figure 2.5 however, may imply that once the problem has been explored it need not be reviewed again (Checkland and Scholes, 1990). It is not the objective of this section to provide a description of SSM but to discuss the elements of this approach that could generate learning activities for the design and implementation of an ISA. For a description of SSM, readers are referred to the numerous writings on the approach (see Avison and Fitzgerald, 1995; Checkland,

<sup>4</sup> While Figure 2.6 is Checkland and Scholes (1990) the figure has been cut and pasted from: <http://www.cs.auc.dk/~jeremy/resources%20files/SSM.PPT>



1993; Checkland and Holwell, 1998; Checkland and Scholes, 1990; Lewis, 1994; Shehata and Bowen, 2001; Wilson, 1984).

One of the main advantages of SSM comes from the ‘perceived’ problem situation and who is ‘perceiving’ the problem. This can be labelled as an unstructured problem situation (see stage 1 of Figure 2.5). As reviewed earlier through systems thinking, these problems are not easily stated (Checkland, 1993). The problem situation unstructured requires information to be gathered to help structure the problem situation (Lewis, 1994; Shehata and Bowen, 2001; Wilson, 1984). Through trying to identify the problem situation, different world views will be generated which can then be inquired into (Wilson, 1984). It is considered through investigating problems in this way and the systems perspective taken, SSM embeds a learning perspective within it. The perspective of incorporating systems thinking argued for earlier will now briefly be discussed.

The main model that SSM utilises is labelled as conceptual models. This can be seen as stage 4 in Figure 2.5 and shown pictorially in Figure 2.6. Conceptual models show the transformation process depicted in a root definition (see Checkland, 1993; Checkland and Scholes, 1990) through a number of joined activities (Atkinson, 1986). As a form of helping judge the relevance of any root definition, SSM utilises the CATWOE mnemonic. The CATWOE mnemonic stands for ‘Customers’, ‘Actors’, ‘Transformation Process’, ‘Weltanschauung’, Owner(s), and ‘Environmental Constraints’. The basis of the CATWOE mnemonic is the meaning placed upon the transformation process with the worldview (Weltanschauung) (Avison and Fitzgerald, 1995; Checkland and Scholes, 1990; Wilson, 1984). Checkland and Scholes (1990) discuss that any activity can provide a number of transformations through the way the process is expressed, which therefore invites a variety of different interpretations. By declaring a root definition and using the CATWOE mnemonic can conceptual models be built. Conceptual models display ‘*possible systems*’ which involve possible ways to take action (Atkinson, 1986 p20). The purpose of using models within a methodology can be best described as “*any process of abstracting and representing certain aspects of a situation in a simplified form with some predefined purpose in mind*” (Open University, 2002 p67). Whilst West and Stowell (2000 p298) review what definitions define a ‘model’, they argue a model needs to show “*the product of*

*someone's ideas about a situation and, by reference to 'usefulness', highlights the importance of the intention of the modeller."* It is the conceptual models that undertake this task. Whilst SSM may use this form of modelling, West and Stowell (2000) consider that whatever models are used, the strengths, weaknesses, and other assumptions that have been used have to be considered. It is this aspect of modelling someone's ideas and debating them that can provide useful insights, and allow learning to be undertaken about a particular problem, which could be 'why' and 'how' an IS project should be designed.

Once the system has been modelled within the SSM approach (known as conceptual models within SSM), a check is undertaken that what has been modelled meets the requirements. Checkland and Scholes (1990) state three dimensions to undertaking this task, namely:

- does the model provide the required output,
- are a minimum number of resources being used and,
- will the model meet the aim over a period of time?

Put another way, Checkland and Scholes (1990 p39) list these three criteria as the 3 E's: "*Efficacy (for 'does the means work?'), Efficiency (for 'amount of output divided by amount of resources used')* and *Effectiveness (for 'is T meeting the longer term aim?')*." As an example, Checkland and Scholes (1990 p37) provide a root definition that has been constructed to undertake the task of painting a fence. The root definition for the model is stated as, "*a householder – owned and manned system to paint a garden fence, by conventional hand painting, in keeping with the overall decoration scheme of the property, in order to enhance the visual appearance of the property.*" The conceptual model derived from this root definition is shown in Figure 2.7.

Once a conceptual model has been developed, it can be used as a structure to inquire into the particular problem situation (Avison and Fitzgerald, 1995; Checkland and Scholes, 1990; Shehata and Bowen, 2001). It should be pointed out that the model developed is not a statement of an actual HAS, or is existing in the world, but relates to a number of joining activities (Avison and Fitzgerald, 1995; Checkland, 1993).

This model can be used to bring out debate about the problem situation. Each model is one perspective of the problem situation and needs to be considered through comparison to what implications it would have in the 'real world' (Checkland, 1993). No model can be classed as being valid, or in comparison invalid: a model can only be defended or otherwise not (Checkland, 1993; Checkland and Scholes, 1990).

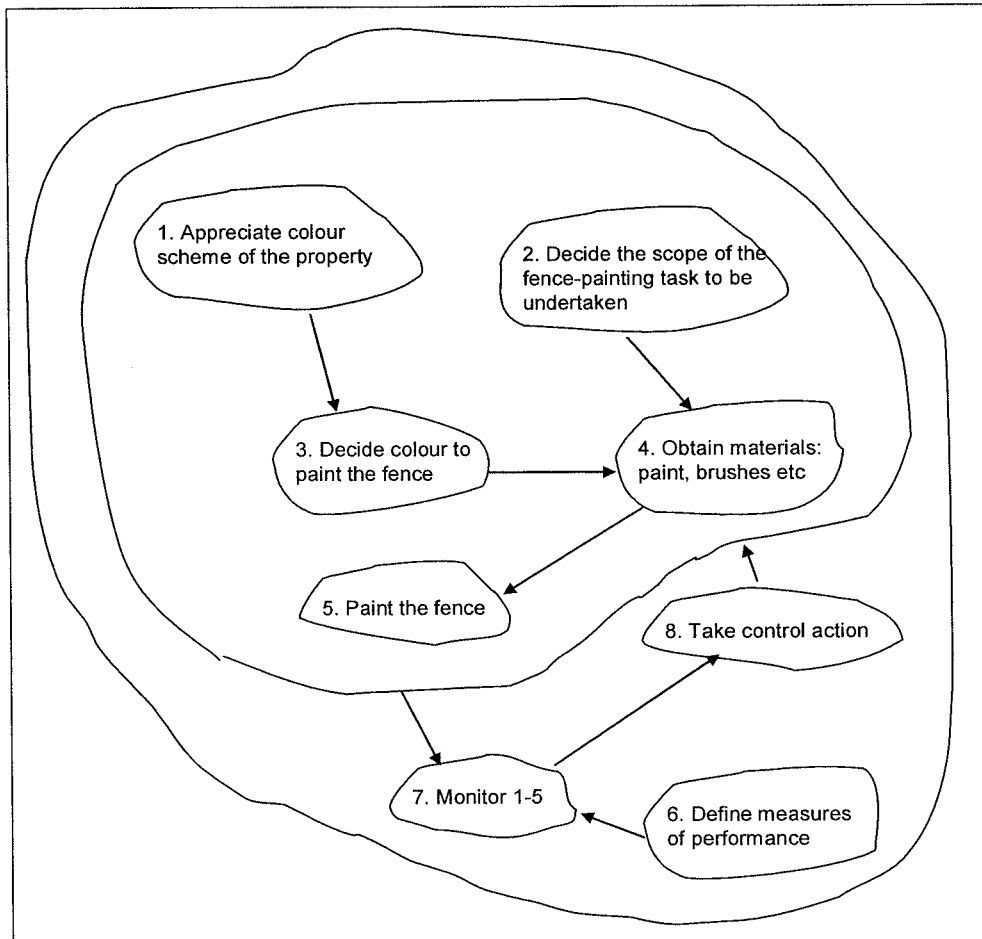


Figure 2.7

*A Conceptual Model Showing a Fence Painting System*

Source: Checkland and Scholes (1990<sup>5</sup> P38)

Through deriving these models, and using the approach of systems thinking, it is stated that any other systems thinking relevant to HAS that would add value to a model should be incorporated (Checkland, 1993; Wilson, 1984). For example, Checkland (1993) points to the work of Stafford Beer (see Beer, 1979) and his viable systems model, or the work of the Tavistock Institute (see ETHICS and Mumford, 1995 and Mumford and Weir, 1979). This implies that other systems thinking could

<sup>5</sup> While Figure 2.7 is Checkland and Scholes (1990) the figure has been cut and pasted from: [www.cems.uwe.ac.uk/~gwatkins/isdp2/04-05/lec8ssm.doc](http://www.cems.uwe.ac.uk/~gwatkins/isdp2/04-05/lec8ssm.doc)

be built into the models, and developed, if they are perceived to add value to the problem situation, which could be very useful especially when examining IS. As can be seen in Figures 2.5 and 2.6 the models derived are compared to the ‘real world’ before deciding to make changes.

In conclusion Checkland and Scholes (1990 p52) summarise that the criteria that SSM seeks “*are ‘systemically desirable’ and ‘culturally feasible’.*” In summing up SSM, the process can be stated as a learning approach to tackling softer more unstructured problems that can occur (Checkland, 1993, 1995). Ormerod (1995 p99) argues that SSM is a highly suitable approach for “*problem solvers or strategy developers.*” As Checkland and Holwell (1998) state, SSM works best as a framework for helping individuals make sense of problems which can then be discussed. Other methodologies may not highlight such a problem until the ISA was implemented. Whilst not an ISD methodology formally, through using SSM, IS design could be aided. Soft Systems Methodology may remove the criticisms that were attributed to the hard methodologies, but how this development should be undertaken still needs to be considered. It would be unfair however, to try and disguise any criticisms that SSM has attracted; these will now be reviewed.

One criticism that Ormerod (1995) discusses about SSM relates to the need to link SSM with other ideas when management style issues are in play, and what roles other areas of the organisation will adopt. Rose (2002) has tried to further develop SSM by incorporating what he develops as the interaction-transformation-interaction (ITI) model, whilst Avison and Wood-Harper (1990, 1995) has developed Multiview to build on the work of SSM. While working with Checkland at the University of Lancaster, Wilson (1984) has added the use of the Maltese cross as a way to use the theory of SSM that could then be used for ISD. Whilst criticisms of SSM are levelled, the advantage comes from the method being seen as a ‘*learning process*’ (Checkland and Holwell, 1998 p160). It is agreed that SSM could adopt other thinking, and that organisational theory is just one idea. This research is focusing on the learning aspects as well as generating learning activities, and the area of the ‘Learning Organization’ could also be paid attention to. As Ormerod (1995 p95) states, “*ironically when soft issues are the focus of attention in a managerially*

*sophisticated arena, SSM may not bring enough insight to the situation.”* Other thinking may be required to get a greater benefit from the approach.

A further criticism comes from the techniques of root definitions and conceptual models that Checkland (1993) himself admits as being difficult, especially if work starts at Stage 3. Bell (1996) (where using SSM or Multiview) acknowledges there are disagreements on the way to construct a conceptual model. Lewis (1994) worked around this complication when investigated a case of SSM being used within a medical practice by removing the language of SSM (root definitions, CATWOE, for example), and used mission statements instead of root definitions. Lewis (1994) goes on to point out that the individuals who use the approach, and undertake the modelling, are the individuals who will get the full benefits and insights. It may be applicable that all stakeholders construct models for debate. Other issues Lewis (1994) found included the willingness of participants to learn the process of SSM as well as finding time to undertake the modelling. Vidgen (1997) is in agreement when he discusses that in his research he used SSM in mode 2 to structure the work while not using the language, methods or teaching the principles of SSM to the participants.

If SSM is expanded to incorporate other thinking, it may not be possible to use SSM if the approach has to be taken in a formal way. As long as the approach remains ‘soft’ and ‘systemic’, other thinking could be used in undertaking the approach (Atkinson, 1986). Atkinson (2000) has gone on to develop the soft information systems and technologies methodology (SISTeM) using soft systems approaches in the first cycle (similar to what Avison and Wood-Harper, 1990 have done in Multiview). From this, Atkinson (2000) goes on to use more information system development tools in the second cycle to try and develop a more suitable approach to ISD. Soft Systems Methodology including other thinking could be used as an approach to help design an ISA, whilst other approaches could be incorporated for implementation issues a team will face. Other tools could be incorporated into the methodology such as those used for client led design (see Stowell and West, 1994). As Stowell (2000) states, when discussing client led design, tools are incorporated that are relevant to the epistemology of the framework. Stowell (2000) lists the appreciative inquiry method (AIM) (see West, 1995) and SSM as two compatible

approaches. One attempt to try and resolve some of these criticisms that have been drawn out could be through Multiview, which will now be discussed.

#### **2.4.5 Multiview**

The Multiview framework has been developed by Avison and Wood-Harper (1990, 1995). Multiview draws from the work of Checkland (see Checkland, 1995; Checkland and Scholes, 1990) and Mumford (1995) as well as examining data analysis and structured analysis (Avison and Wood-Harper, 1990, 1995). It is assumed that Multiview offers a variety of approaches to produce learning, as has been drawn out from the reviews of ETHICS and SSM. Whilst these works are drawn upon, the original authors (e.g., Checkland, 1995; Checkland and Scholes, 1990; Mumford, 1995) may not agree with how their work has been interpreted and used (Avison and Wood-Harper, 1990). For example, Checkland and Scholes (1990) may argue it is philosophically impossible to join SSM and ETHICS. Multiview however, has been described as a framework (in comparison to labelling it as a methodology similar to SSM) that can combine both the hard and soft issues related to ISD (Avison et al., 1998; Avison and Wood-Harper, 1995). An overview of the Multiview framework can be seen in Figure 2.8 below.

Multiview has been described as a framework that addresses information systems development but also focuses upon the issues that Soft Systems Methodology (SSM) also addresses (Avison and Fitzgerald, 1995; Avison and Wood-Harper, 1995). Using Figure 2.8, Avison and Wood-Harper (1995) point out other methodologies as addressing only questions 4 and 5, while some may address question 3 also. Avison and Wood-Harper (1995) continue by adding that Multiview addresses the soft issues through question 1 and question 2, while question 2 is seen as only being addressed by one methodology and that relates to ETHICS. Each of the five stages shown in Figure 2.8 relates to a stage within the framework. In a similar manner to the SSM review, this section will not offer a description of each stage of Multiview, but instead refers readers to the works of others (see Avison, et al., 1998; Avison and Fitzgerald, 1995; Avison and Wood-Harper, 1990, 1995).

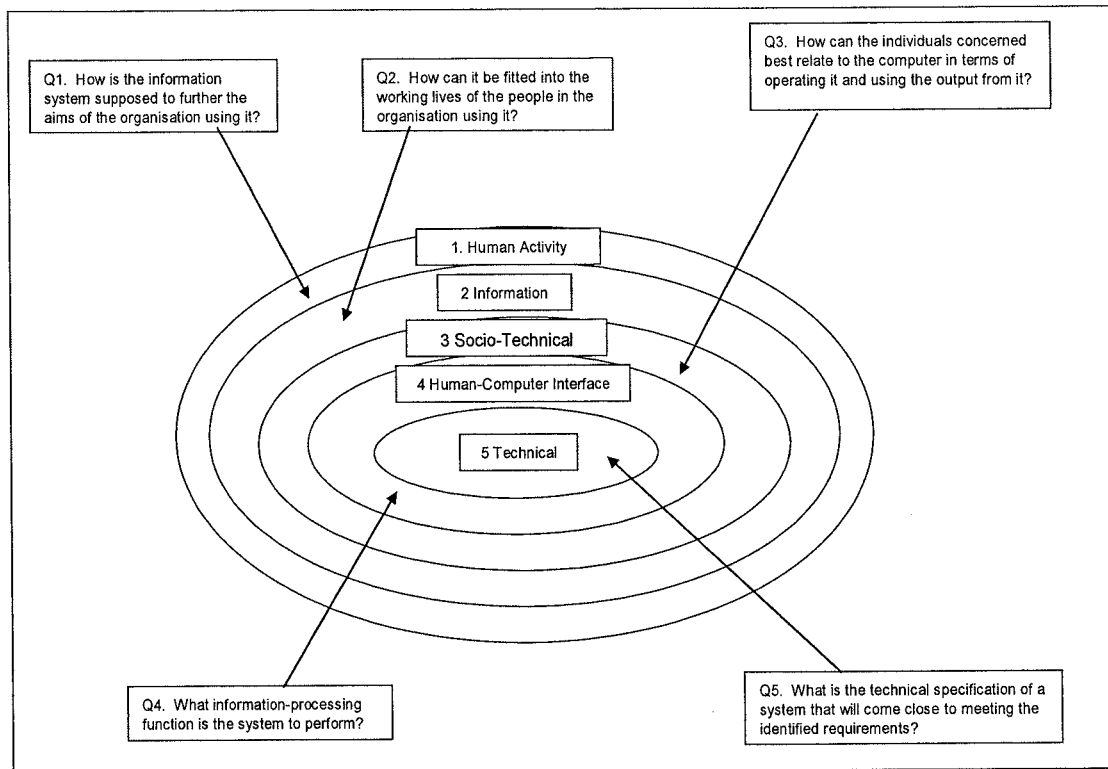


Figure 2.8

*The Multiview Framework*

Source: Avison and Wood-Harper (1995 P106)

Each stage of the Multiview framework is stated by Avison and Wood-Harper (1995) as undertaking a different perspective that is required to be addressed by the potential users. Allowing participants to investigate different perspectives could provide learning opportunities as opposed to following just one perspective. Different roles of the analysis that have been drawn through using Multiview “*are those of “technical expert” (functionalist), “facilitator” (interpretive), “agent for social progress” (radical structuralist), and “change catalyst” (radical humanist)”* (Avison et al., 1998 p128). This may imply that not only does the methodology incorporate different perspectives, but that the potential users of the methodology may also take on different roles. Allowing the potential users to undertake these different roles may also provide an opportunity to learn about any problem situation and technology development. Trying to resolve the problem of allowing a variety of perspectives to be a focus throughout the design and the implementation may create problems in its own right. The reason for this thinking relates to the argument of IS being more than just hard technology: individuals should consider IS by the social system and stakeholders that will be affected (Avison et al., 1998; Avison and Wood-Harper, 1990). By undertaking each stage, the outcome is hoped to show a system that is

suitable, with relation to both technical and user aspects (Avison and Wood-Harper, 1995). Avison and Wood-Harper (1995) do point out some words of wisdom from using Multiview. These reflections relate to the time it can take to learn the methodology (Avison and Wood-Harper, 1995). As Multiview contains approaches that tackle the 'hard' and the 'soft' problems, as well as not stating a precise model that is to be followed rigorously with appropriate techniques to use within each stage, it can take a long time to learn (Avison and Wood-Harper, 1995).

Similarly to Soft Systems Methodology, Multiview does not have to proceed through the stages in order, as some stages can be omitted (Avison and Wood-Harper, 1995). Through the early development of Multiview, the users stated the first stage was considered as useful whilst other stages were too complicated, and others stated the entire framework was too complex (Avison and Wood-Harper, 1990). The opinion adopted is that while Multiview tries to develop another approach for ISD it has only tried to join a variety of techniques that are considered valuable (i.e., SSM and ETHICS). In doing this, the designers of Multiview have not looked at the current problems of IS design and implementation – even though Multiview can be useful for this. Using Multiview may not provide a suitable approach that participants can use to embed a learning approach within the framework. Other issues that affect the suitability of Multiview include the interpretations revealed, the individuals involved, and the area that is being focused upon; what power relations are involved; and the amount of actual participation from the users (Avison and Wood-Harper, 1995). Avison and Wood-Harper (1990) state the process that is undertaken to design and implement an ISA as a long, time – consuming process that affects a large number of people, however, this process is thought to be continuous. Through this continuing process, Multiview may be regarded as the framework to help with the complete design and implementation cycle. Even though Avison and Wood-Harper (1995) present these reflections it could be fair to say that the same criticisms can relate to many of the methodologies reviewed, even the hard approaches that follow set processes rigorously. Nevertheless, since its first development and use, Multiview has evolved to take into account the lessons learnt and the current conditions that ISA are implemented in (Avison, et al., 1998; Bell, 1996). From the original Multiview framework has emerged Multiview2 (Avison, et al., 1998).



Avison et al., (1998) discuss the initial Multiview as espousing the typical model of ISD that has been criticised (i.e., that is followed in sequence). As well as trying to correct this attracted criticism, Avison et al., (1998) has widened the approach to take into account how the software can be developed and implemented. These issues may be included as new organisational forms are in effect, as well as newer diversified technologies that were not being used within organisations at the time of Multiview (Avison et al., 1998). Whilst these changes have occurred, research continues in the use of Multiview as a full approach for designing and implementing ISA. One of the main criticisms that can be attributed to Multiview and even Multiview 2 relates to one of the main reasons why the approach was developed. By moving from the 'soft' to the 'hard' issues, a change in philosophy is undertaken. Bell (1996) supports this when he highlights the conclusion of his research on a methodology needing to perform a difficult balance of providing rigour as well as being able to be used within different environments. It is this balance that Multiview has tried to take account of. It is argued that an approach would be better suited which can constantly focus the softer issues throughout the development that Multiview may not take account of after stage 3.

One word of warning however, comes from Avison and Fitzgerald (1995) that identifying the perfect methodology may be an impossible task. Selecting one over another may give advantages, but can also pose problems. For example, it is argued that selecting a methodology will add more value to the research undertaking the process informally, and this is the reason most methodologies have been designed. The next section attempts to select one of the three methodologies (ETHICS, SSM, and Multiview) that are seen to promote learning approaches that can be used to design and implement an ISA which draws on the learning that the approach can promote.

#### **2.4.6 The Selection and Justification of a Soft Methodology that this Work can adopt**

It was stated that the individuals who were to use the IS should be involved in helping to design the proposed technology. Lewis (1994) considers that in the political arena of an organisation, it is the individuals with power that will collect the appropriate data needed to define the 'system'. If a 'hard' approach were adopted to help with this data collection, the first phase would usually involve addressing what the problem

is and how it is defined (Lewis, 1994). Lewis (1994) postulates that the adoption of a hard approach may not allow the participation of all stakeholders in defining what the problem actually is. It could be considered that to select a methodology that primarily consists of techniques may distract from the problem situation, as the techniques are fitted to the problem area. A better technique is to apply a flexible approach that allows the problems to be explored (Wilson, 1984). It is in response to this problem that Stowell (1995, 2000) and Stowell and West (1994) have called for client led design.

It should be noted that the ISD methodologies that have been reviewed can fall into what can be described as ‘soft’ and ‘hard’ approaches. The hard approaches (e.g., Structured Analysis, Design and Implementation Systems (STRADIS); Information Engineering (IE); Structured Systems Analysis and Design Methodology (SSADM)) were highlighted in order to build on the systems life cycle approach that was criticised as being unsuitable, due to the problem or IS project taken without further exploration. The softer methodologies attempt to explore the problem situations that were discussed within systems thinking and were demonstrated as the ‘what’ and ‘how’ types of questions. As Lewis (1994 p26) notes *“it is the ‘hard’ systems approaches which are best known and generally described as being ‘the systems approach’; perhaps as a consequence they are also the form of systems thinking which has been most criticised.”* A number of the methodologies reviewed mainly focus upon the technological aspects in what Stowell and West (1994) describe as a reductionist approach, or provide the techniques that may distract from exploring the problem situation. It was argued through Wilson (1984) that the ‘users’ of the proposed ICT leave the development up to a technical department who focus mainly upon the technological aspects. Some of the methodologies highlighted display these characteristics and are useful for this purpose, but not for all information systems development.

It is argued that methodologies for focusing mainly upon technological issues cannot solve all problems, especially within an organisational context, but a methodology or framework that only focuses upon the soft issues may not help with designing and implementing ISA. As Galliers (1995) states, the world in which we live is forever turbulent. The philosophies of some methodologies discussed would provide

difficulties for IS that find coping with change problematic (Galliers, 1995). A methodology that can utilise the soft and hard approaches where applicable may be a more suitable approach. Stowell and West (1994) note the increase in research trying to join the soft problem areas with the hard technological aspects to resolve these types of problems (see Multiview as an example). It is this type of thinking that would be more beneficial in developing technologies, with a focus on generating learning activities. As Stowell and West (1994) put it, the individuals who are to use the technology should help in the design of it. No one has the responsibility of trying to interpret other individual's needs, but technology people and users of the technology can work together (Lewis, 1994; Stowell and West, 1994).

ETHICS, SSM and Multiview are argued to possess the softer aspects that are important. A general discussion on the benefits that each methodology contains that may draw out the learning activities was undertaken, but a number of criticisms were also identified. Selecting one of these methodologies over the other two will be a subjective issue. As an attempt to compliment the benefits that have been drawn out through each of the three methodologies reviewed, the work of Kolb (1984) can be used. Kolb (1984) researches what he calls experiential learning and how experience is a source of learning and development. Whilst other issues could be argued to relate to learning, Kolb's (1984) learning cycle can be used to compare any elements of learning that each of the three methodologies contain within them. From using Kolb's (1984) learning cycle and the benefits already highlighted within each methodology a more suitable choice can be made. A brief overview of Kolb's (1984) work will be given.

Kolb (1984 p40) believes experiential learning is “... *a four-stage cycle involving four adaptive learning modes – concrete experience, reflective observation, abstract conceptualisation, and active experimentation.*” Within Kolb's (1984) model, the dimensions of experience and abstract conceptualisation and active experimentation and reflective observation are opposing dimensions. Learning is argued by Kolb (1984) to be achieved by negotiation of each of the four processes and how they are settled. Kolb (1984) describes each of the four phases as follows,

*“...the abstract/concrete dialectic is one of prehension, representing two different and opposed processes of grasping and taking hold of experience in the world – either through reliance on conceptual interpretation and symbolic representation, a process I will call comprehension, or through reliance on the tangible, felt qualities of immediate experience, what I will call apprehension. The active/reflective dialectic, on the other hand, is one of transformation, representing two opposed ways of transforming that grasp of ‘figurative representation’ of experience – either through internal reflection, a process I will call intention, or active external manipulation of the external world, here called extension” (Kolb, 1984 p41 underlines are emphasis in original).*

Readers are referred to Kolb (1984) for more detail on his experiential learning cycle. In this research, Kolb’s (1984) work can now be used to try and investigate the learning capabilities that are embedded within each of the methodologies (ETHICS, SSM, and Multiview). This is undertaken in Table 2.4 below.

Dimension of Experiential Learning/Methodology	ETHICS	Soft Systems Methodology	Multiview
<b>Concrete Experience (Apprehension)</b>	Draws on the experience of the users who help design the 'system'.	Allowing the problem situation to be explored before making a choice on what the problem actually is. Draws on a number of participants' experiences.	Draws on the work of SSM in allowing the problem situation to be explored through a number of participants. However, these can be lost at the latter stages whilst the focus is more on the technical issues.
<b>Reflective Observation (Intention)</b>	Little chance of reflection due to working through the stages of ETHICS. Whilst the main focus is on participation and on the users who will use the ISA this is to find the best fit between the social and the technical issues and not on reflecting on the main problems that an IS project was posed to solve.	Through constructing models, comparing them to what has been expressed as the problem situation, allows further debate and reflection on the problem situation before looking at how and what to change is systemically desirable and culturally feasible.	In the early stages, the same as SSM in constructing and comparing models. At the latter stages, the focus is more on the technical aspect of an ISA so little reflection can be undertaken with the models developed, as they will reflect an IS specification.
<b>Abstract Conceptualisation (Comprehension)</b>	Whilst ETHICS has a tool to measure job satisfaction, this looks to accommodate the socio-technical problems that occur as part of ISD. There are no formal mechanisms that can be used	SSM contains a variety of modelling tools (rich pictures, CATWOE, and conceptual models). These tools can represent different 'systems' that can be debated and discussed focusing on what to change, and	Through the work of SSM, rich pictures, CATWOE's, and conceptual models can be used to explore the problem situation. At the later stages data flow and entity relationship diagrams can be used. These could be difficult

Dimension of Experiential Learning/Methodology	ETHICS	Soft Systems Methodology	Multiview
<b>Abstract Conceptualisation (Comprehension)</b> continued	to conceptually interpret the problem situation as it is taken as given.	how to change it, questions with relation to the problem situation.	for participants to use or understand if they are not familiar with such an approach.
<b>Active Experimentation (Extension)</b>	Through trying to identify a suitable fit between the social and the technical issues any gaps identified is what needs to be taken account of. This is the primary purpose of ETHICS and helps teams and organisations manage the change process an IS project brings.	Through taking a systems perspective on problem situations different 'systems' can be constructed through the modelling stages allowing experiments to be carried out that can help focus the problem situation further.	Through the stages that draw out the work of SSM and ETHICS this can be undertaken. At the latter more technical stages and a change in philosophy from the 'soft' to the 'hard' less experimentation is undertaken.

Table 2.4

*Comparing the Learning Capabilities of ETHICS, SSM and Multiview through Using the Work of Kolb (1984)*

Table 2.4 has tried to draw on the work of Kolb (1984) in identifying within each of the three methodologies the learning that is embedded within them. Whilst all three promote aspects of learning, it should be clear to see that SSM when compared to what Kolb (1984) identifies as learning – undertakes this more appropriately than ETHICS and Multiview.

From the three methodologies identified (ETHICS, SSM, and Multiview), the most suitable methodology for designing and implementing information systems with an emphasis on learning activities is Soft Systems Methodology. The other methodologies that were also identified as being suitable in this literature review (ETHICS and Multiview) were not selected due to using the work of Kolb (1984) (see Table 2.4) and the critiques presented in each of the discussions. The limitations will be summarised here. For ETHICS:

- The number of stages the approach incorporates.
- The time it takes to undertake the methodology.
- The request that all stages need to be undertaken which also does not allow reflections on observations.
- The confusion on the exact ETHICS approach.
- No feasible way to expand the methodology to take into account other thinking.
- Lack of processes for comprehending and contemplating the problem situation.

The criticisms for Multiview include:

- The time it can take to learn the approach.
- The time it can take to undertake the approach.
- Whilst incorporating a number of important stages further stages are argued difficult to adopt.
- Little chance of experimentation and reflection in the latter stages.

Whilst these points highlight the criticisms, the reasons why SSM was adopted are now reviewed. The methodology clearly incorporates systems thinking as an important aspect within the methodology, but in a way that provides a suitable structure to help individuals explore problem situations. Soft Systems Methodology is also believed to be not so structured that aspects that could be explored become overlooked. It is the combination of individual participation in an adjustable cycle, which incorporates systems thinking that is seen as the advantage. Other advantages include:

- Can be used to undertake problems that are not easily defined such as designing and implementing information systems.
- Could be changed to take into account specific individuals and organisations.
- Requires participation to an extent if value is to be obtained from using the approach.
- Could incorporate other thinking within the framework.
- Does not have to be followed in sequence or used as a 'pure' type.
- Allows a variety of different perspectives to be drawn on, reflected, and modelled.

With all the advantages, there were also disadvantages. These include:

- May be difficult to comprehend the modelling approaches.
- Individuals may follow the process prescriptively and misunderstand the principles of working in mode 1 or 2.
- No direct link to the implementation of an information system.
- May require a change in philosophy from the soft to hard if information systems applications are to be implemented.

It is SSM's approach of being examined as a framework as opposed to a methodology, as well as the ability to change the approach and the emphasis on the learning that the approach espouses, which is of prime importance, and which ETHICS or Multiview approaches might not allow. However, as Guo, Wu and Stowell (2000) point out, whilst SSM promotes inquiry as continuous, no concrete



answers may be drawn. This issue needs to be kept in mind if the approach is expanded and used in practice. Finally, it is the opinion that if SSM could be expanded to take into account further learning practices that this work focuses upon, the approach could prove to be most beneficial. This thinking in attempting to expand SSM will be undertaken in the next chapter.

## **2.5 Summary**

The implementation of information systems into an organisation has the power to shape the world of individuals, and produce conditions that have not in the past been possible (Zuboff, 1988). Individuals within organisations are only considering ISA through the competitive element that a technology can bring, while neglecting the other issues that can be generated, such as learning activities. With this narrow perspective, individuals within organisations are implementing technologies, but are failing to grasp other issues that should be paid attention too. Systems thinking was argued as one way that individuals can examine the design, implementation, and use of IS. Through the exploration of problems that individuals within organisations encounter with IS, this argument was further strengthened. Current developments with relation to IS were reviewed, with methodologies taking a prominent role. This discussion led for a call for a methodology that incorporates aspects of systems thinking, with participation from individuals who will be the end users. From a number of methodologies reviewed, SSM was identified as containing such thinking. Even with all of the advantages SSM contains, the approach faces some criticisms. In an attempt to answer the objectives of this research, and try and address a number of the criticisms, it was argued that another body of research should be incorporated within the methodology. For this research, the area of the learning organization could serve this purpose. This, along with exploring what learning can encompass, is undertaken in the next chapter.

## **Chapter Three: Exploring the Concept of The Learning Organization, Learning Organization Thinking and Learning Practices**

### **3.0 Introduction**

The previous chapter explored the problem that managers and other individuals face with designing and procuring information system applications (ISA), as well as the different approaches that can be used. It was argued that learning about the problem situation is necessary for effective design, implementation, and taking into account the different perspectives on IS. Systems thinking and Soft Systems Methodologies are appropriate in terms of generating a learning cycle in the analysis and development of human activity systems (HAS). It is argued, however, that Soft Systems Methodology (SSM) in particular can further be enhanced to incorporate thinking from theories of learning and the learning organization (LO). This chapter deals with issues of 'learning' and 'organisation', the 'individual' and to an extent knowledge – as shown in Figure 3.1.

Figure 3.1 is a lower level model of Figure 2.1 (shown in the previous chapter). Whilst previously this figure focused on exploring how managers and other individuals could design, implement and manage ISA through using soft methodologies, in this chapter we explore the theories of learning, its relationship to the individual, and how it can be used to further inform the theories of the learning organization. Figure 3.1 tries to emphasise that dialogue and language development can inform how organizational learning can be undertaken, and how this theory informs the work on the learning organization. This chapter first deals with the difficult issue of the learning organization and organizational learning, before exploring theories that both these fields adopt. It then goes on to discuss the importance of dialogue and language development. Three theories of learning are adopted which compliment each other by emphasising the importance of the social aspect of learning, and how this can inform the theories of organizational learning and the learning organization. Finally, the theories discussed are used to expand SSM to further focus the learning that the approach can bring.

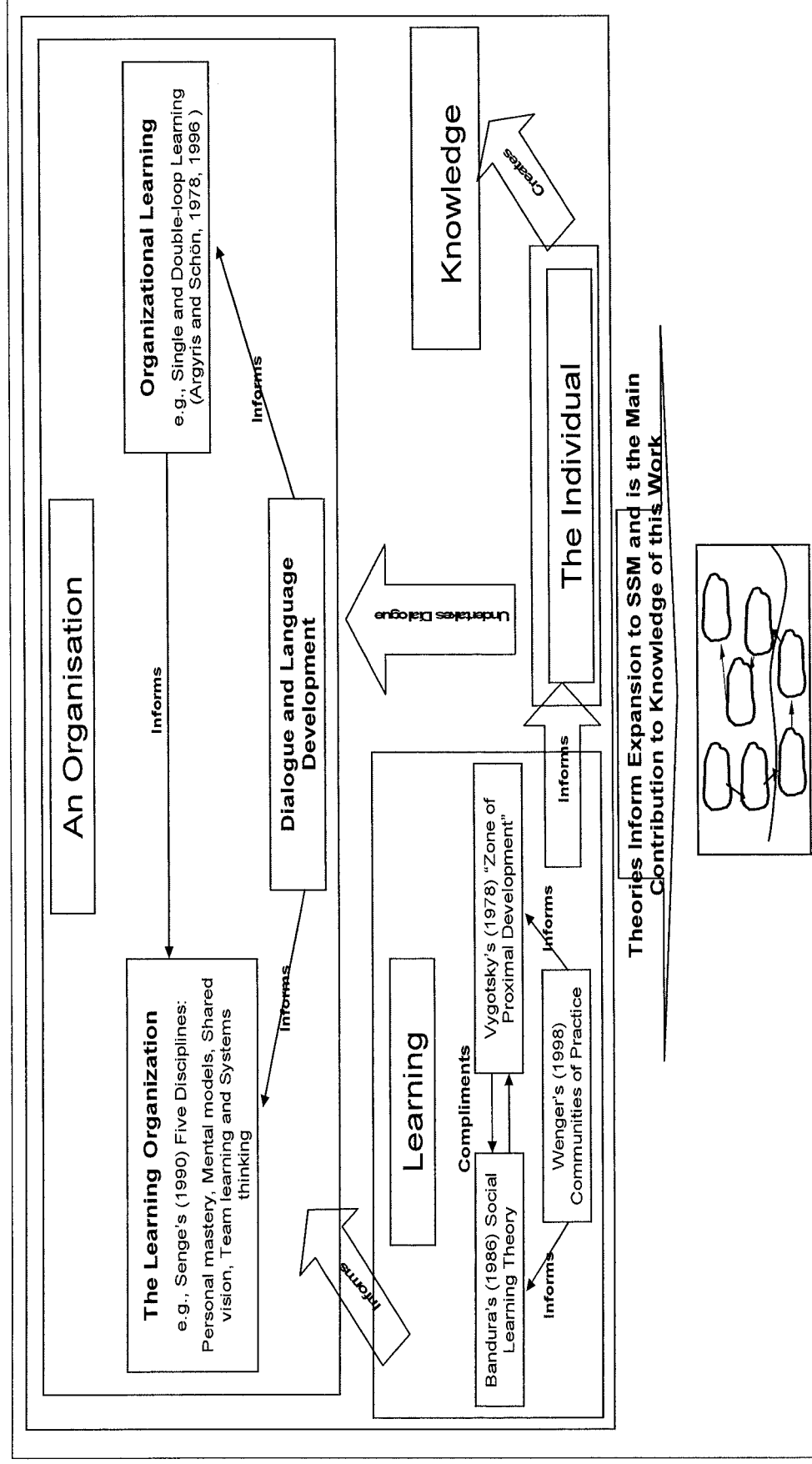


Figure 3.1

*A Perspective on Learning, an Organisation, and the Individual and how these Theories could be Used to Expand SSM*

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While the learning organization may add value to this work and in particular SSM, the field still faces many problems and a lot of criticisms (see Garratt, 1999). It is not the objective of exploring this chapter to justify the existence, or non-existence, of the learning organization; however, the literature needs to be reviewed if any of this thinking can be adapted to fit with the SSM approach. The aim of this chapter first is to focus on how learning is being undertaken by individuals through the use of information systems (IS) as well as how individuals currently use and consider IS with an emphasis on learning. Secondly, an exploration on learning, whether individual, departmental, or organisational, can be undertaken, irrespective of whether the organisation is a 'learning organization' or not needs to be focused upon. Thirdly, there is a discussion of what learning actually constitutes and how this can be seen. Finally, an attempt is made to explore how this learning could be undertaken through the SSM framework. The next chapter (Chapter Four) deals with how SSM can be expanded to take into account the theories of the learning organization and learning theories.

#### **3.1 The Current Role of Information Systems in Generating Learning within Organisations**

Whilst the current role of ISA in generating learning activities may be distracting from the main issue of this research, they need to be briefly reviewed. If IS can be designed through embedding a learning approach, this learning could be developed further through the use of the ISA. A starting point for this discussion can come from the top of an organisation. The design and implementation of IS specifically for learning is not a favoured strategy for senior managers (Currie, 1995). The implementation of ISA considers the returns the organisation hopes to achieve (Currie, 1995). The nature of learning has shown that it is difficult to quantify the returns from learning, and as a result, the expected rates on implementing an ISA through using a strategy of learning are not easily measured. To explore this issue, how individuals currently use and consider IS is reviewed. From this review, the area of systems thinking is further argued as a way that individuals within organisations can investigate and help with the design of IS.

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### **3.1.1 How Individuals Currently Use and Consider Information Systems with an Emphasis on Learning**

Through their research, Johannessen, Olaisen and Olsen, (1999) found individuals within organisations that are using IS to reduce costs, found it difficult to produce successful innovations. In contrast to Johannessen, Olaisen and Olsen's (1999) findings, Serafeimidis and Smithson (1999) admit that ISA are being used as a labour and cost cutting device, but individuals are also using ISA for improved customer service, improved flexibility within an organisation, and to increase innovation. These activities, through the use of ISA, may be classed as a form of learning that individuals are starting to exploit. Individuals within organisations planning IS investments should decide what the primary aspect of the IS is; for example, learning, or to reduce costs. If the prime motivator is to reduce cost, then it is feasible for management not to expect individuals to then improve quality by using the same technologies.

This work is focusing on how a learning approach can be embedded within soft methodologies for designing and implementing ISA, but when individuals refer to information systems development (ISD), they could be discussing different aspects of IS design and implementation, even though they think they are talking about the same thing as has been emphasised. This is a problem. For example, Lee (1999), when researching management information systems (MIS), discusses what MIS means. For Lee (1999), MIS is more than the hardware, software, and technology matters, but the whole concept of the technology. This perspective is formed through the obvious statement that no ISA can implement itself and as a result, ISA can be implemented in different ways (Lee, 1999). Within the language of an organisation all technologies could come under the common title of information systems. To try and bridge this problem, Checkland and Holwell (1998 p153 – 154) propose a number of steps to create technologies:

- *Start from a careful account of the purposeful activity served by the system.*
- *From that, work out what informational support is required by people carrying out the activity.*
- *Treat the creation of that support as a collaborative effort between technical experts and those who truly understand the purposeful action served.*

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- *Ensure that both system creation and system use are treated as opportunities for continuous learning.*

Checkland and Holwell (1998) examine the process in undertaking technology development (or as they state, IS) as providing an area for learning to take place. If this learning can be harnessed through design and implementation, learning could be undertaken as part of IS design and implementation. What all these processes emphasise is that learning could be a key process in discussing, designing and using IS. As an attempt to place a greater focus on learning the area of the learning organization could be adopted.

#### **3.2 The Learning Organization and Organizational Learning**

The learning organization is regarded as important due to the world becoming more complex, and organisations constantly having to change to match their environments (Appelbaum and Gallagher, 2000; Garratt, 1999; Lee, Bennett and Oakes, 2000; Lines, 2005; Mayo and Lank, 1994; Pedler, Burgoyne and Boydell, 1997; Schein, 1993). What is important to note is that change affects all organisations (Ozturk, Kim and Wilemon, 2003; Szamosi and Duxbury, 2002) whether it is planned or not. Kolb (1984) states individuals have to find a new approach to restore effectiveness for both the organisation and the individuals within it. The learning organization is put forward as a way to handle such change (Finger and Bürgin, 1999).

The emphasis on learning and the areas of the learning organization and organizational learning may have come about due to reduction of advantage resources such as capital, materials, and technology, once brought to companies (de Geus, 1988; Drucker, 1993; Lee, Bennett and Oakes, 2000; Murray, 2002; O'Keeffe and Harington, 2001; Senge, 1990). It is considered that learning and intellectual capital can only happen if the climate, culture (e.g., Alvesson, 2002; Avison and Myers, 1995; Kransdorff, 1998; Schein, 1992) and structure (e.g., Argyris, 1999; Carley and Hill, 2001; Nonaka and Takeuchi, 1995) of an organisation is in place. It takes all of these issues combined to achieve a competitive advantage (Lennon and Wollin, 2001; Garratt, 1987). Huysman (1999) agrees when she comments that the strive for learning can be stalled due to cultural, structural and personal issues. New ways have to be found to adopt and manage these changes. Designing, implementing, and

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managing ISA is in itself a process that needs to be undertaken to adapt to change. While it may not be easy, this work examines the incorporation of the thinking of this field into the SSM framework. Any similarities that the learning organization and organizational learning theories possesses, in connection with systems thinking – and SSM in particular – need to be focused upon, or the differences explored.

The terms ‘the learning organization’ and ‘organizational learning’ and the way they have been used interchangeably has added problems to this area of study (Ayas, 1999; DiBella, 1995; Matlay, 2000; Örtenblad, 2001; Stewart, 2001) – especially to managers trying to implement processes to achieve these conditions. Lee, Bennett and Oakes (2000) therefore classify the ‘learning organization’ and ‘organizational learning’ into separate categories. The first category which is described as prescriptive, uses consultancy experience; while the second is descriptive, and uses empirical research (Argyris and Schön, 1996; Ayas, 1999; Lee, Bennett and Oakes, 2000; Sun and Scott, 2003). Both categories face criticism; the first for being too generalised as ‘one right way’, and the second for failing to produce results that could be useful for managers (Lee, Bennett and Oakes, 2000). Lindley and Wheeler (2001) argue that work on the learning organization has increased due to the interest in creating a learning organization, while organizational learning is more academic based to enable focus upon learning initiatives within an organisation. Reynolds and Ablett (1998) propose that the research on the learning organization and organizational learning is based on rhetoric and does not take account of other factors within the organisation.

A learning organization can be described as an organisation that supports the learning of all members of that organisation, which can then continually transform itself (Mayo and Lank, 1994; O’Keeffe and Harington, 2001; Örtenblad, 2001; Pedler, Burgoyne and Boydell, 1997; Simon, 1996). Or alternatively, a learning organization is one “*where learning is taking place that changes the behaviour of the organisation itself*” (Reynolds and Ablett, 1998 p26). The explicit problem is that the learning organization is still not fully understood.

It is argued by some authors (i.e., Argyris, 1999; Argyris and Schön, 1978) that organisations do not achieve learning; it is the individuals within the organisation who

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learn. It is this perspective that is adopted in this work. Mayo and Lank (1994), as well as Rhodes (1996) agree, as these authors examine the behaviour patterns of the individuals that make up the organisation change, in response to the environment they perceive, which can allow the organisation to be seen as learning. It is considered by Jensen and Rasmussen (2004) that at the bottom level, individuals learn by acquiring new skills and knowledge. At the top level, the organisation learns through the combination of these skills and knowledge (Jensen and Rasmussen, 2004).

While the perspectives of Mayo and Lank (1994), and Rhodes (1996) may be plausible, how to undertake these processes is more difficult. It needs to be examined to see if organizational learning can help or is related to the learning organization. Reynolds and Ablett (1998) review the work of Burgoyne (1995), and Argyris and Schön (1978), to find a definition of organizational learning. Reynolds and Ablett (1998 p26) argue that organizational learning occurs where the learning that is taking place “*changes behaviour of individuals or groups within the organisation.*” A taught method of learning will not achieve the desired outcomes for undertaking organizational learning if the advice of the above work is not taken into account. As a consequence Huber (1991) discusses how he believes organizational learning is undertaken. Huber (1991) proposes that four issues and processes need to be understood to undertake organizational learning more fully. These issues include knowledge acquisition, information distribution, information interpretation and organisational memory (Huber, 1991). In order to undertake the issues, Huber (1991) discusses various sub-issues and sub-processes that make up the main constraints and processes. While he believes these processes are involved, further research has been called for with the integration of past work. Even though the definitions of a learning organization may be different, the important point to highlight is the emphasis on the issue of ‘change’. From the many arguments and different perspectives reviewed, DiBella (1995) provides a simple definition. It is DiBella’s (1995) definition of the learning organization and organizational learning that is adopted in this work. DiBella (1995 p287) posits that “*organizational learning is something that takes place in organizations, whereas the learning organization is a particular type or form of organisation in and of itself.*”



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Reynolds and Ablett (1998) as well as Stewart (2001) admit that the research into how an organisation moves from undertaking organizational learning to a learning organization, has been difficult. Reynolds and Ablett (1998) have tried to explain the transformation and note the use of models by some authors and frameworks by others. Their point emphasises the difficulty researchers have faced. It is argued that the learning organization cannot be described, due to the individuality that different organisations possess (Örtenblad, 2002, 2004). An organisation should be allowed to develop its own version of what the learning organization depicts (Örtenblad, 2004), especially if “*the learning organization is an ideal*” (Finger and Bürgin, 1999 p136). This could be through an organisation’s history and vision (Pedler and Aspinwall, 1998) not being identical to another’s.

Appelbaum and Gallagher (2000) review the work of Argyris and Schön (1978) as a reference to the many different learning approaches, and the relation to the metaphoric view that an approach takes. It is important to draw on the work of Lewis (1994) when he states that even though many perspectives of an organisation can be presented, all organisations undertake processes of some type. The work of Argyris and Schön (1978) as presented by Appelbaum and Gallagher (2000), seen in Table 3.1 describes a number of perspectives that an organisation can be perceived from.

Image	Learning Approach	Details
Group	Social psychology	Organisations are collections of persons who interact on a regular basis and share a sense of collective identity. Learning is a term applicable to individuals within the context of a group, but when individuals learn to interact with one another so as to carry out shared tasks, one can speak of the group itself as learning.
Agent	Instrumentalism Management Theory	Organisations are seen as instruments for the achievement of social purposes. The organisation itself is a subject, which is conceived as sentient, active, intelligent, and purposeful. One could intervene so as to improve organisational learning by increasing the organisational store of useful knowledge, by improving the design of individual decision-makers.
Structure	Sociology Theory of bureaucracy	Organisations are regarded as an ordered array of role-boxes connected by lines, which represent flows of information, work, and authority. Organizational learning has to do with change of structure. An organisation may be said to learn when it restructures itself in response to change in internal or external environment.
System	Cybernetics Information theory	Organisations are thought of as self-regulating entities, as complexes, which maintain certain essential

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Image	Learning Approach	Details
System (continued)	Cybernetics Information theory	constancies through cycles of action, error detection, and error correction. Organizational learning consists of the self-regulating process of error detection and error correction itself, whether or not maintenance of the organisational steady state is mediated by the self-conscious efforts of individual members of the organisation.
Culture	Anthropology Ethno-methodology Phenomenology	Organisations are perceived as small societies in which people create for themselves shared meanings, symbols, rituals and cognitive schemata, which allow them to create and maintain meaningful interactions among themselves and in relation to the world beyond their small society. Organizational learning may refer to: <ul style="list-style-type: none"> <li>• the processes by which individuals become socialised to the culture of the organisation;</li> <li>• the processes by which organisational category schemes, models, images, or cognitive modes are transformed in responses to error, anomaly or inconsistency; or</li> <li>• The process by which members of an organisation become cognisant of the social reality they have jointly constructed, subject that sense of reality to critical reflection, and seek deliberately to transform it.</li> </ul>
Politics	Political theory Theory of Socio-political Movements	Organisations are political systems in the sense of both government and of interplay of contending interests and associated powers. Organizational learning might consist of the processes by which members of an organisation learned to invent and apply, in concerted organisational action, the strategies most appropriate to the task of winning the game in which they are engaged with other organisations. Organizational learning might also consist of a process of converting organisational politics to organisational inquiry, i.e., achieving collective awareness of the processes of contention in which members are engaged, gaining thereby the possibility of converting contention to co-operation.

Table 3.1

*Previous Organizational Learning Theories*

Source: Appelbaum and Gallagher (2000 P42)

Table 3.1 suggests that there are many different ways to perceive organizational learning (Appelbaum and Gallagher, 2000; Argyris and Schön, 1978). This may be through the many images that can be used to represent an organisation. Mayo and Lank (1994) believe that considering an organisation in these ways is one answer to examining a 'learning organization'. This examination is undertaken in response to the criticisms the culture, strategy, structure, and systems an organisation utilises (Mayo and Lank, 1994). It was this type of thinking that Ormerod (1995) called for; but from this perspective, using 'images' or 'metaphors' may not add value to the

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learning organization. However, the perspective that was argued for (System) may be commensurable to investigate and undertake thinking from the learning organization and organizational learning. What is certain is that when creating the learning organization, or undertaking organizational learning, the participation of all individuals is required (Pedler, Burgoyne and Boydell, 1997). This can be seen as one link back to Soft Systems Methodology, as the approach promotes participation. Participation is further highlighted as being important for more than just ISA design and implementation. An organisation may go down different paths when trying to undertake organizational learning and attempting to develop a learning organization, but participation is important. Undertaking organizational learning or adopting learning organization thinking may add value if it can be created within the SSM framework.

#### **3.2.1 Undertaking Organizational Learning or Adopting Learning Organization Thinking**

It is important for an organisation who wishes to change to know what to change and how (Kransdorff, 1998). It is believed that learning plays a role in identifying what to change and how. Garvin (1993) considers too much attention is paid to themes and metaphors instead of the details of how to actually achieve a learning organization (see Table 3.1 for an example). One perspective that Kransdorff (1998) argues can overcome this problem – and the area he has focused his research in – is one he calls ‘organisational memory’. This issue has not been lost in the IS field. Hoffer and Valacich (1993) see ‘memory’ as a way to record and capture history. Technologies are developed to store and search for information (Hoffer and Valacich, 1993), creating an organisation’s memory.

Organisational memory can be described as the difference between information that is classed as explicit, and knowledge that is tacit (Huber, 1991; Kransdorff, 1998), while Simon (1996) adds that an individual leaving an organisation erodes organisational memory over time. Organisational memory that is contained within the individuals of the organisation, documents and files, as well as other literature scattered throughout the organisation is a form of map (Argyris and Schön, 1978; Huber, 1991; Levitt and March, 1996; March, 1996) which relates to shared understandings as opposed to routines (Örtenblad, 2004) that are retained over time (Hurley, 2002). Organisational memory is stated to affect and be affected by the use of IS (Elkjaer, 1999; Hofer and

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Valacich, 1993; Scott Morton, 1991). Kransdorff (1998) and Kolb's (1984) belief is that for an organisation to 'learn', the employees are exposed to experiences that require reflection; and from this reflection, new knowledge is created. March, Sproull and Tamuz (1996 p5) go further when they express that, "*by acting, reflecting and interpreting, organisations learn what they are.*" Krippendorff (1995a) adds these organisational memories, need to be kept viable if it is hoped that learning will be achieved. Using the SSM approach may help the process as well as the technology being used to create, store or share organisational memory. Why learning is not being undertaken successfully within organisations therefore needs to be addressed.

Buckler's (1998) research has concentrated on how poor understanding by management has led to other individuals and, in effect, organisations failing to learn. Buckler's (1998) link between learning and performance is shown in Figure 3.2

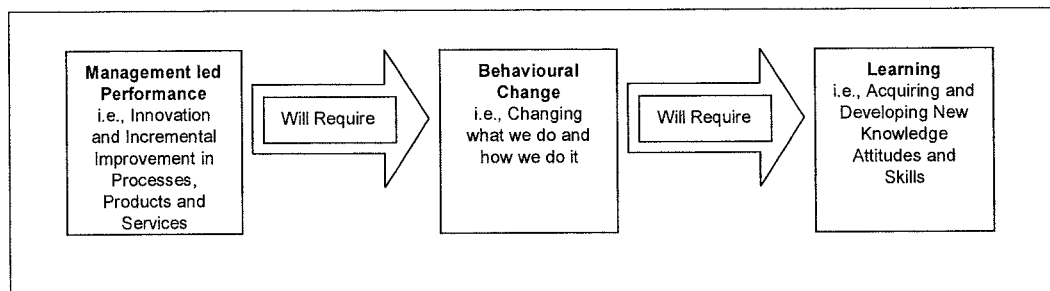


Figure 3.2  
*The Link between Learning and Performance Improvement*  
Source: Buckler (1998 P16)

The model developed by Buckler (1998) in Figure 3.2 is simple, and shows what he argues is the link between management performances and actual learning. The advantage of the model is its simplicity, but the main disadvantage is that the model does not show how an organisation can create a behavioural change and achieve the desired learning. Buckler (1998) has developed a learning methods table (Table 3.2) that adds value to the link between learning and performance improvement (Figure 3.2). It is argued that the 'behavioural change' section of the model (Figure 3.2) is very important, because according to Senge (1990) people who only focus on their position within the organisation will not understand how all positions in the organisation interact. This thinking was also highlighted in discussing how IS relate to an organisation, and the argument for using systems thinking was proposed. By

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changing the behaviour of the organisation, it could be possible to design a process where individuals know how they fully contribute. Using SSM may be one approach to undertake this process.

	<b>Taught</b> ←	→ <b>Discovery</b>
<b>Model</b>	Learn theory based on research. Change behaviour. Teach others, until better theory is developed.	Identify problems. Experiment to discover solutions. Develop theory. Change behaviour. Apply to similar situations.
<b>Focus</b>	Teacher-centred Learning managed by the organisation	Learner-centred Learning managed by the individual
<b>Motivation</b>	Extrinsic	Intrinsic
<b>Culture</b>	Controlled Bureaucratic	Empowered Autonomous
<b>Theoretical Basis</b>	Behaviourist School – Skinner et al., Determinism	Gestalt School – Kohler et al., Free will
<b>Advantages</b>	Consistency Conformity Low risk	Creativity Innovation Responsiveness to customers
<b>Disadvantages</b>	Can stifle intrinsic motivation Can cause conditioned responses which create barriers to change and learning	Can focus on personal rather than organisational objectives Higher risk of failure

Table 3.2  
*Learning Methods – Two Extremes*  
Source: Buckler (1998 P17)

As can be seen in Table 3.2, the taught method focuses more on a style that management would prefer to adopt, as the focus is on control, while the risks associated with the taught method is low. In comparison, the discovery method focuses on the learner at an individual level, which leaves the learner empowered to create and innovate within the organisation. Overall, Table 3.2 is vague, but at least it makes a distinction between two types of learning. It could be argued that trying to undertake the ‘discovery’ aspect in isolation is what management fears. Using the SSM approach may allow the framework to be used as a way to undertake ‘discovery’ elements, through examining problems and trying to take purposeful action. Management may consider using SSM as a more suitable approach than just letting individuals undertake ‘discovery’ aspects. Two outcomes may then be accomplished.

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Firstly, SSM may allow organizational learning to be undertaken more effectively, as well as utilising thinking attributed to the learning organization. Secondly, the combined approach may allow the design and implementation of IS to enhance this learning, as well as design the ISA for further learning generating opportunities. The problem is this may not be as simple as it sounds.

It has been noted through this review that there is a difference between organizational learning and the learning organization. What these two different areas mean with relation to learning and the organisation needs to be reviewed if, as has been stated, organizational learning is how individuals learn within an organisation, whilst the learning organization is an organisational form.

#### **3.2.2 Examining Organizational Learning and The Learning Organization Theories**

If the SSM framework can be expanded to take into account learning organization thinking and undertake organizational learning, through use of the approach then within the field, what ‘learning’ means, needs to be explored. If Sense’s (2005) work is taken, SSM may be useful; as he proposes that what individuals learn is separate from organizational learning, as individuals are the agents that invoke action on behalf of the organisation, which can then create organizational learning. In order to translate individual learning to organizational learning, dialogue and other methods of communication are undertaken, as they “*generate individual and interpersonal understanding and collective actions and thereby, individual knowledge is made explicit and shared and can become embedded with an organisations collective memories...*”(Sense, 2005 p178). Sense (2005) continues by considering learning as being contextual as well as being constructed socially through individuals’ characteristics, the environment encountered, and individuals’ behaviour as the processes involved. Weick (1995) agrees, as he argues that if communication does not take place an organisation will no longer be in existence. If communication is not clear, an organisation cannot perform properly. How individuals learn initially needs to be understood, followed by how organizational learning can be undertaken, before moving on to how dialogue can be undertaken as Sense (2005) discusses. Reviewing these processes may give further clarification on how SSM may be expanded, or how SSM may help undertake the processes that organizational learning is argued to require.

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### **3.2.3 Learning within the Field of The Learning Organization**

Pemberton and Stonehouse (2000) investigate two existing theories of learning. The theories have been classed as the behaviourist or stimulus response approach, and the cognitive approach (Griffey, 1998; Pemberton and Stonehouse, 2000; Yeo, 2002). The behaviourist approach accepts that learning takes place through a change in stimuli in the environment (Pemberton and Stonehouse, 2000). Studies show that this perspective tends to use a more quantitative methodology (Yeo, 2002). Alternatively, the cognitive approach proposes that learning is complex, and is undertaken by using reason, experience, and experiments (Pemberton and Stonehouse, 2000). Studies that use this perspective consider the thinking processes that are involved in learning, and use more qualitative methods (Yeo, 2002). The problem is that picking one approach over the other, as the field implies, may not add value.

In contrast, more modern perspectives of cognition, such as those of embodied cognitive science and autopoiesis (Maturana and Varela 1980) move away from distinguishing between inside and outside (Small and Sice, 2003). Cognition is believed to be conditional to a state of embodiment and the ability that an individual has to be able to differentiate between different states, and it is this thinking that is thought to be a consequence of an individual's specific structure (Small and Sice, 2003). The cognitive approach considers learning as more than applying rules to certain problems, but it is complex, requiring the use of skills to solve problems (Yeo, 2002). These arguments still continue.

In order to tackle all these issues and undertake 'learning', the body of research has examined organizational learning as the process that can generate meanings from past experiences. The most quoted reference for undertaking organizational learning comes from Argyris and Schön (1978, 1996) through double-loop learning. It is considered that by being able to undertake double-loop learning, organizational learning can be achieved. Pedler, Burgoyne and Boydell (1997) believe that this work is important, as it investigates how individuals learn how to learn. This literature will now be examined.

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### 3.2.3.1 Single and Double-Loop Learning

Argyris and Schön (1996 p3 with original emphasis preserved) state that, “*the generic schema of organizational learning includes some informational content, a learning product; a learning process which consists in acquiring, processing, and storing information; and a learner to whom the learning process is attributed.*” Ghosh (2004) continues by emphasising that organizational learning is not just the combined learning of individuals, which is implied by Robinson (1995), if knowledge is encoded properly. In this view, learning can be seen to be undertaken through individuals within the organisation, as well information that the organisation possesses having to be ‘unlearned’ (Argyris and Schön, 1978; Baker, Jensen and Kolb, 2002; Henderson, 1997; Mayo and Lank, 1994).

Argyris and Schön (1978 p300-301) propose, “*organisations learn when the organisational inquiry, carried out by individual members, becomes embedded in organisational theory-in-use and recorded in organisational memory through the media of maps and images.*” Due to this definition this work adopts the position of Pedler, Burgoyne and Boydell (1997) in double-loop learning focuses on individuals learning how to learn. To undertake learning within an organisation, Argyris and Schön (1996 p18) believe what these rules and other procedures are must be identified, and result in a change in behaviour, to what can be described as an “*organisations theory-in-use.*” While this sounds plausible and straightforward, it may not be as simple. Changing certain aspects of an organisations theory-in-use may not count as learning, if they relate to issues that reduce an organisations performance through individual’s slackness or deliberately undermining of the rules of the organisation (Argyris and Schön, 1978, 1996; Lines, 2005).

Argyris and Schön’s (1996) work on describing how to alter an individual’s behaviour, may be a start in changing an organisations-theory-in use through questioning the governing rules that are seen to be tacit. So while it is the individuals who undertake this questioning process, as agents for the organisation by acting on the maps, they also undertake organizational learning when this mismatch between what was expected and what actually happened occurs (Argyris and Schön, 1978). These outcomes challenge the organisations theory-in-use (Argyris and Schön, 1978).



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By correcting the errors, and by analysing the 'system', 'double-loop learning' can be achieved (Argyris, 1999; Argyris and Schön, 1978, 1996). In double-loop learning, the outcome of the investigation is used to change the theory-in-use that is currently held, which in turn may change the theory-in-use of the organisation overall (Argyris and Schön, 1978, 1996) and as a consequence individuals learn how to learn. Many individuals within organisations are able to undertake single-loop learning, but find it difficult to undertake double-loop learning (Argyris and Schön, 1978; Robinson, 2001). It is not the intention to describe what and how double-loop learning is, but to provide an overview and argue how this work can be useful – and if it can be used in conjunction with SSM. Readers are referred to Argyris and Schön's writings (1978, 1996) for more in depth descriptions and explanations of double-loop learning. In summary, this work adopts the position that double-loop learning can be seen as a double-feedback loop that produces not only the errors, but also the processes that defined the error (Argyris and Schön, 1978; Henderson, 1997; Robinson, 2001). The process of single and double-loop learning can be shown through Figure 3.3.

Argyris (1999) claims that the model which (Figure 3.3) shows learning is only achieved when a match or mismatch has occurred. Double-loop learning requires an individual to question their own beliefs and assumptions; for example, if an individual learns of a problem why was nothing done earlier to correct it (Argyris and Schön, 1978, 1996; Isaacs, 1993)? It is important to note that single-loop and double-loop learning are not classed as right or wrong, only that learning is undertaken through individuals within the organisation (Argyris, 1982). Undertaking double-loop learning may not constitute organizational learning, as in order for this to occur, the outcomes of the learning need to be acknowledged through each individual's images of the organisation, as well as the organisations theory-in-use. This can be seen as similar to Weick's (1995) organisational sensemaking. Weick (1995) offers the perspective that to change a group of individuals, the group must change not only what is stated, but what the words actually mean.

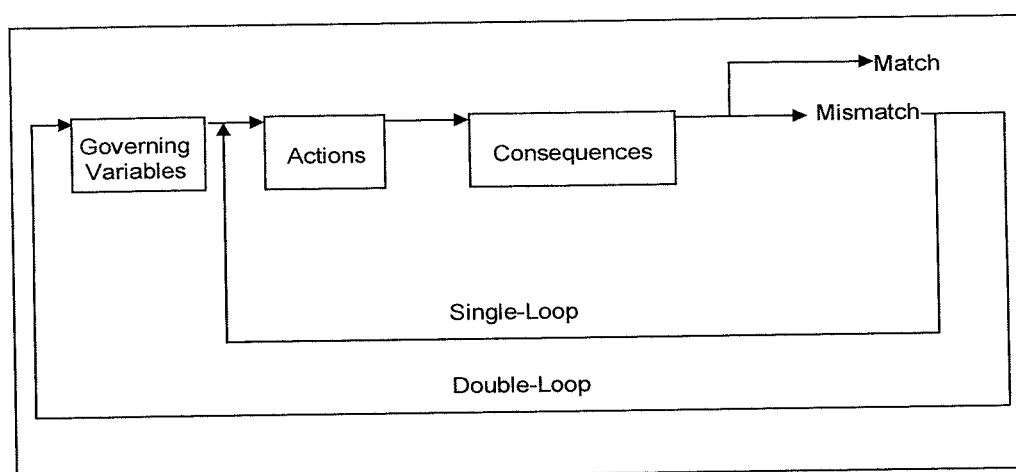


Figure 3.3  
*Single-Loop and Double-Loop Learning*  
 Source: Argyris (1999 P68)

In summary, when reviewing the series on organisational development, Argyris and Schön (1996) notice the similarity in assumptions, as well as the connections between other processes including IS. It is also noted the similarities in single and double-loop learning and the work of Weick (1995) on organisational sensemaking. This implies that other disciplines are attempting to use ideas and thinking from other fields (which this PhD work is also trying to do). The work of Argyris and Schön (1978, 1996) on double-loop learning is particularly relevant in organisations, especially in designing IS. The SSM framework consequently could be adapted to consider this thinking. For example, investigation of the problem situation and development of models could allow a questioning process that examines actions and consequences, allowing single-loop learning. If participants go further with the questioning process and the models developed, these could highlight the governing variables that are taken allowing these to be altered as well as tackle the problem situation. Along with Argyris and Schön (1978) many researchers reference the work of Senge (1990) on building the learning organization as a starting point. While it is argued that individuals do the learning on behalf of the organisation, value may be added by the thinking that Senge (1990) argues for.

### 3.2.3.2 Using Learning Organization Thinking

While the learning organization and organizational learning has been separated into two categories, the categories are based on a number of key issues. These issues are namely that (1) learning within the organisation is required, and (2) how this process

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takes place is important, as well as what may threaten learning within an organisation and how to remove these threats (Argyris and Schön, 1996). At the same time the problem is that the organisation has to remain flexible and adaptable (Argyris and Schön, 1996). While Argyris and Schön (1996) have argued that organisations physically do not learn but have demonstrated how organizational learning can be undertaken, even though this may be difficult to undertake; the issues relating to the learning organization may add value if they can be drawn out when using the SSM framework. Pedler, Burgoyne and Boydell (1997) consider the fifth discipline, which Senge (1990) has developed, as allowing the learning organization to be accessed within the business world. Senge (1990) agrees with the work of Argyris and Schön (1978, 1996) but conveys complexity with an organisation limiting the learning (Robinson, 1995). It is issues such as these that Senge (1990) developed in the fifth discipline. Senge et al., (1994) believe the learning organization is an organisation that allows individuals to undertake change. It was with this thinking that the learning organization as a field was explored, hoping to provide further thinking to the SSM approach.

Senge (1990) believes that to build a learning organization, five disciplines need to be mastered. These disciplines include: personal mastery, mental models, shared vision, and team learning, with the fifth discipline being systems thinking. Table 3.3 has been constructed from the work of Senge (1990) to summarise what the first four disciplines are, before reviewing what Senge (1990) refers to by systems thinking. Readers are referred to Senge (1990) for further detail on the disciplines.

Discipline	Characteristics
Personal Mastery	<ul style="list-style-type: none"> <li>• Personal mastery relates to the “<i>discipline of personal growth and learning</i>” (Senge, 1990 p141).</li> <li>• What is important for an organisation and how this reality can be seen more clearly.</li> <li>• Allows creative tension to form.</li> <li>• Identifies the personal growth individuals can achieve.</li> <li>• Senior management state personal mastery cannot be measured and therefore is not overly encouraged.</li> <li>• Considers the gap between what is currently being experienced and a vision of what is felt to be required as a source of energy.</li> <li>• To encourage personal mastery the organisations environment must allow individuals to create visions as well as question organisational processes.</li> </ul>
Mental Models	<ul style="list-style-type: none"> <li>• Relates to how individuals see aspects of their world. “<i>...new insights fail to get put into practice because they conflict with deeply held internal images of how the world works, images that limit us to familiar ways of thinking and</i></li> </ul>

Discipline	Characteristics
Mental Models (continued)	<ul style="list-style-type: none"> <li>• <i>acting</i>" (Senge, 1990 p174).</li> <li>• Mental models need to be managed, which results in testing, improving and bringing to the front issues individuals mental models hold otherwise the same model will remain.</li> <li>• Individuals may have different mental models, as they perceive different aspects of the same thing as well as certain issues being tacit and many mental models being in existence at once.</li> <li>• Could be related to the work of Argyris and Schön (1978, 1996) through an individual's espoused theory and their theory-in-use.</li> <li>• Skills need to be developed when using mental models if the outcomes are to be put in practice.</li> <li>• Reflection and inquiry are required when using mental models.</li> </ul>
Shared Vision	<ul style="list-style-type: none"> <li>• <i>"A shared vision is not an idea. It is not even an important idea such as freedom. It is, rather, a force in people's hearts, a force of impressive power"</i> (Senge, 1990 p206).</li> <li>• Takes account of the creation of something within an organisation that all members see.</li> <li>• Is argued as the energy to undertake generative learning.</li> <li>• A shared vision however, is more than just about increasing market share or winning with relation to an opponent.</li> <li>• Allows the creation of trust.</li> <li>• Developed from a personal vision and is argued as the foundation for shared visions.</li> <li>• Shared visions decrease if more people are involved that bring conflict to the situation.</li> <li>• Can be used as an inquiry technique into the future.</li> <li>• Systems thinking is required to undertake a shared vision so a view of the whole vision can be undertaken.</li> </ul>
Team Learning	<ul style="list-style-type: none"> <li>• <i>"Team learning is the process of aligning and developing the capacity of a team to create the results its members truly desire. It builds on the discipline of developing shared vision. It also builds on personal mastery, for talented teams made up of talented individuals"</i> (Senge, 1990 p236).</li> <li>• Individuals may work hard but this does not convert into a team effort.</li> <li>• Relates to the whole of the team.</li> <li>• In order to undertake team learning involves developing and mastering dialogue and language development that the team wants to undertake so no one perspective dominates.</li> <li>• Requires practice and use.</li> </ul>

Table 3.3  
*The Characteristics of the Disciplines*  
 Adapted From: Senge (1990)

Table 3.3 has been constructed to provide a summary of the four disciplines Senge (1990) argues are required in building the learning organization. The problem that many people highlight with Senge (1990) relates to undertaking the processes shown in Table 3.3 in practice. For example, it should be noted that a number of the disciplines must be mastered in order to undertake other disciplines. Where to begin could be considered as a problem. While Senge's (1990) book is called "The Fifth Discipline", he regards this fifth discipline as systems thinking. While not dealing with this discipline in the ways he has addressed the other four (see Table 3.3), Senge

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(1990) demonstrates the use of systems thinking throughout the book. Differences can be drawn between the systems thinking argued for by Senge (1990) and what Checkland (1993) and Checkland and Scholes (1990) have stated is applicable for SSM. This difference takes the form of the soft thinking that was argued as applicable in comparison to the hard systems thinking that Senge (1990) considers. Nevertheless, while Senge (1990) adopts the work of other systems thinkers (e.g., Sterman, 1994), as well as systems dynamic thinking (e.g., Sastry, 2001), his work could apply to SSM. This thinking can be argued to be so if it is explored from the modelling aspects of examining the human activity system (HAS) (Checkland, 1993; Wilson, 1984) through stage 4 as declared by Checkland (1993). During the 1980s, and the development of systems dynamics, the area was seen to be problematic as they were required to enact mental models and capture them (de Gues, 1999) and this was not a simple task. de Geus (1999) notes the models became a place for criticisms and highlighting missing aspects, instead of using the models for aspects of playing and learning. How Senge (1990) uses systems thinking in building the learning organization needs to be explored.

Whilst Senge et al., (1994) uses other systems thinking, systems thinking is seen in a similar way to that of other systems thinkers (e.g., Checkland, 1993; Wilson, 1984; Open University, 2002), which is the whole and not just the independent parts of the whole, and as a language to talk about the disciplines (Kofman and Senge, 1993). Senge et al., (1994) use a number of organisational archetypes that have been created, and through using systems thinking, the issues related to these archetypes can be examined, as well as changed for the better. Senge (1990) believes that most organisational themes repeat themselves over a period of time and from this, twelve different archetypes have been developed and used. For Senge (1990 p69), “*systems thinking is a discipline for seeing the ‘structures’ that underlie complex situations, and for discerning high from low leverage change.*” Undertaking, identifying, and attempting to change situations allows individuals to take a different perspective via the joining of relationships in comparison to just linear aspects, and other effects that occur at just one point in time (Senge, 1990). It is this change that is the purpose of the discipline systems thinking (Senge, 1990). From the twelve archetypes identified, Senge (1990) discusses nine within his book, and gives a detailed overview within the book’s appendix. The nine archetypes can be listed as:

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- Limits to growth
- Shifting the burden
- Eroding goals
- Escalation
- Success to the successful
- Tragedy of the commons
- Fixes that fail
- Growth and underinvestment
- Balancing process with delay

Senge (1990) believes the purpose of systems thinking is to identify where 'leverage' can be identified, so changes can be implemented that will hopefully provide improvements to an organisation. This could be argued to be similar to the goals of the use of SSM, through the modelling that is completed and the discussions the models produce.

The process of using an archetype can be compared to Argyris and Schön's development (1978, 1996) by trying to undertake single and double-loop learning as an individual, or a group of individuals, which needs to highlight what is happening and why these processes are happening. From this review, what is identified as undesirable is changed. The problem relates to knowing which archetype to use to examine the problem (Senge et al., 1994). Nevertheless, the issues causing a disagreement can be worked through by using the archetypes, generating a dialogue, and developing a shared language that may help improve not only the models developed, but also the situation. It may be possible to use the techniques involved in SSM to create the disciplines, through using the SSM framework and utilising the systems archetypes as a way of expressing problem situations or developing conceptual models. This may be similar to the argument that the work of Argyris and Schön (1978, 1996) could also be incorporated, as the SSM framework provides a place to utilise these theories in comparison to a more ad-hoc approach, which may be used to undertake the disciplines and double-loop learning. What is certain is that if individuals are to use SSM to design IS for generating learning activities they have to come together, and speak about these issues. In order for this to happen, as both

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Argyris and Schön (1978, 1996) and Senge (1990; Senge et al., 1994) point out, a suitable dialogue and language needs to be developed.

### 3.2.3.3 Dialogue and Language Development

As humans, we exist in language (Small and Sice, 2004) or “*action through language*” (Flores et al., 1988 p156). The issue becomes that language should not be regarded as a system of symbols composed into patterns that stand for things in the world (Bohm 1999). It is considered that language did not evolve just to take in an outside world, and so it cannot simply be considered as a tool to reveal that world (Small and Sice, 2003). Kofman and Senge (1993) investigate language as either a set of labels to describe reality or as a way to generate new models that can be used for individuals to live together.

Language is a venue for action, coupling the cognitive domains of two or more actors (Maturana and Varela 1992), so action is produced through language within a world that is made up from language (Flores et al., 1988). It is often preferential to discuss languaging as an act rather than language as a symbolic notation. It is what human beings say is true or false; with them agreeing in the language they use (Small and Sice, 2003). This is not an agreement in opinions but in a form of life (Wittgenstein 1968). Krippendorff (1995a) can be found agreeing when he states languaging is a social process. For example, Kofman and Senge (1993) argue that the learning organization is an organisation that is created through the use of individuals' language and is regarded as an organisation individuals would like to work in. Language can be stated as more than just talk.

Dixon (1998) believes talk within an organisation is routinely undertaken, but not understood with little being classed as dialogue. Krippendorff (1995b p105 underlines are italics in original) believes, “*languaging is a social process in which we jointly construct realities for each of us to see, occupy and to talk into. Evidently, languaging can open our ‘eyes’ to alternative ways of seeing and create new ways of being-with Others.*” The problem is that as most talk is comprised as taking a games quality, whatever is being spoken is not seen as real (Dixon, 1998; Krippendorff, 1993), or relates to winning and losing (Isaacs, 1993). In contrast, Fay, Garrod and Carletta (2000) provide an example of the dynamics a meeting may follow. At some points an individual may be engaged in discussions with only a few people, while at

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another point the individual may be listening to a speaker who is dominating the meeting (Fay, Garrod and Carletta, 2000). By the individual engaging in different points, the individual may have a different perspective of what had happened, in comparison to other individuals who attended the same meeting (Fay, Garrod and Carletta, 2000). Talk can be taken from this description as an essential part of development in general, and is very important in using the SSM approach, and the learning organization and organizational learning conditions discussed.

While dialogue is more than just 'talk' and 'discussion' (Bohm, Factor and Garrett, 1991), the definition can be best presented by Isaacs (1993 p25) when he states, "*the word dialogue comes from two Greek roots, dia and logos, suggesting meaning flowing through.*" Isaacs (1993) continues by adding that this definition on the subject of dialogue, is different to issues of defence and other such unproductive issues taking place using talk that may be labelled dialogue. Senge et al., (1994 p353) uses Isaacs (1993 p25) work to define dialogue "... *as a sustained collective inquiry into everyday experience and what we take for granted.*" The purpose of dialogue is to create a place where individuals can explore the relevance of their experiences, as well as what feelings are involved in these experiences (Bohm, Factor and Garrett, 1991; Senge et al., 1994) and to uncover what lies beneath it (Isaacs, 1993).

The purpose of dialogue is to move to a higher level through the response generated (Schein, 1993; Senge et al., 1994) and to consider the impact an individual has when speaking about the whole (Isaacs, 1993). Viewing the whole is important to Isaacs (1993), as he investigates the problem that arise when issues are divided into categories, and further sub-categories, in order to create meanings. These meanings become distorted, and individuals forget that they created the categories originally. Organizational learning requires a process for inquiring about and discussing these categories (Isaacs, 1993), and this is what dialogue is argued to be (Schein, 1993). Or dialogue can be used as a way to identify and solve problems (Schein, 1993). What is proposed so far is that firstly, similar to using systems thinking to investigate information systems development (ISD) within organisations, as well as using organizational learning, and learning organization thinking, dialogue may be a discipline that can be used to 'talk' about how to design, implement and manage an ISA which can enable learning within the SSM approach. Secondly, dialogue may be



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a way, which SSM also encompasses, that individuals can discuss their own reality instead of a single perception of the universe where every individual shares the same experiences (Dixon, 1998; Krippendorff, 1995b).

Within her book, Dixon (1998) points to a number of theories that help create dialogue (see Dixon, 1998). While not discussing the theories in detail a number of points can be drawn:

- The theories relate to making tacit the issues individuals hold explicit through talk.
- The theories try to help individuals reveal an overall picture of issues under discussion and not just separate instances.
- Through using a theory to create dialogue, the emphasis on developing shared meanings and what individuals are actually saying removing issues of right and wrong.
- For individuals to undertake the theories and speak through dialogue, they need to come together in the organisation.

Isaacs (1993) supports Dixon (1998) on the points drawn. Dixon (1998) continues by adding that the theories reviewed relate to uncovering the tacit, and through dialogue, these issues can be displayed without recrimination, while constructing new ones that can be re-tested (Dixon, 1998). Dixon (1998) believes that organisations need to create processes to aid dialogue as well as allow relationships to be built that can benefit from dialogue. It is proposed that SSM can achieve this purpose; by expanding the approach further from organizational learning and the learning organization, dialogue may be incorporated into the approach, through the processes and as an outcome of the process itself. Soft Systems Methodology could help operationalise organizational learning, learning organization thinking and dialogue, whilst these processes enhance the tools and techniques the SSM approach contains.

Whatever method is used to try and undertake dialogue (e.g., telling stories cf. Rhodes, 1996), certain characteristics need to be defined. To undertake the above dialogue processes, and tackle this issue, Dixon (1998) has devised two categories

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which include speech acts (what individuals do within dialogue) and situation variables (conditions under which speech acts are undertaken). Table 3.4 is constructed from the various authors from whom Dixon's (1998) techniques for dialogue draws on, which can be seen in her book.

Speech Acts In Dialogue	Situation Variables In Dialogue
Provide others with accurate and complete information including feelings that bear upon the issue.	Members feel free from coercion.
Advocate one's own position.	Participants have equal opportunity to participate – including the chance to challenge, question, refute, and reflect and to hear others do the same.
Make the reasoning in one's own views explicit – say how one got from the data to one's conclusion.	Participants are heterogeneous in terms of such factors as personality, sex, attitudes, diverse experiences, and ability levels.
Invite others to comment on or inquire into one's own reasoning.	The context is co-operative, individuals feel it is safe to challenge each other, and controversy is viewed as constructive.
Identify reasoning errors in others.	Information and expertise are distributed among participants and participants do not feel the need to defer to one individual.
When others' view differs from one's own, inquire into others' reasoning.	Meetings are held without purpose or agenda.
Confirm others' personal competence when disagreeing with their ideas.	Groups have positive outcome interdependence.
Design ways to test competing views.	Groups have means interdependence.
Regard assertions (one's own and others') as hypotheses to-be-tested.	
Voice the perspective of others.	
Change position when others offer convincing data and rationale.	
Illustrate and publicly test inferences.	
Back up generalisations with concrete examples.	
Advocate the exertion of effort to achieve mutual goals.	
Acknowledge similarities in ideas as well as differences.	
Reflect critically upon presuppositions and their consequences.	
Weigh evidence and assess arguments objectively.	

Table 3.4  
*Speech Acts and Situation Variables in Dialogue*  
Source: Dixon (1998 P93 – 94)

Table 3.4 lists a number of issues that may need to be included if dialogue is to commence. These processes are not set, as the purpose of dialogue is exploration in undertaking the process and continued evolving with an emphasis on learning (Bohm, Factor and Garrett, 1991). Table 3.4 has been used to try and show that whatever actions are used to create dialogue they should be emphasised. Nevertheless,

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undertaking these acts and variables may allow aspects which control individual's behaviour to be observed without them being aware (Bohm, Factor and Garrett, 1991).

From the arguments presented in this section, it may be possible to expand the original SSM approach to incorporate organizational learning, and learning organization thinking, through creating a shared language that can be the result of dialogue. If trying to undertake the processes this section has emphasised, the most important factor to remember relates to allowing individuals the opportunity to speak, as well as be heard, which in turn will allow the individual to listen and hear others (Baker, 2002). When using SSM, this could be important when investigating the perceived problem situation and the development and debate of models. Baker's (2002) work can be used in concluding this section when she argues that the more choice an individual has in accepting or disagreeing with what is being heard, the less chance there is that an individual will remain at a distance, or have to resort to attack or defence. It is with this thinking that dialogue is argued as important in undertaking organizational learning and learning organization thinking. While this section has paid considerable attention to organizational learning and the learning organization, what learning actually *is* seems to have been neglected. An attempt will be made to address this problem by looking at a number of learning theories that are believed can be useful in promoting learning, and how it can benefit SSM.

#### **3.3 Learning**

The reason attention is being paid to the 'learning organization', is that if organisations intend to compete in the market place, learning is seen to be the key (cf. Buckler, 1998; Kransdorff, 1998). The problem is that it has been found that individuals do not know how to learn (Argyris, 1999). In contrast to this problem, learning is difficult to investigate; and so many researchers take an objectivist stance (Easterby-Smith and Araujo, 1999). Previous research mainly focuses on groups within an organisation, but only recently has the focus moved to the individual (Cullen, 1999). Learning can be described as a very complex process (Kautz and Thaysen, 2001) as individuals learn in different ways (Cheetham and Chivers, 2001). Where and how learning is undertaken should be identified, if SSM can be expanded to further aid the design and implementation of an IS.

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This section attempts to address how learning theories could contribute to understanding the learning organization, and how to better undertake or enhance organizational learning. This thinking can be best summarised by Lave and Wenger (1991) when they examine a focus on the individual, tendency to encourage knowledge, learning and other skills as being non-personal. Most work within the learning organization field examines only communities of practice (COP) as a theory of learning, as developed by Lave and Wenger (1991) and Wenger (1998) (e.g., Boud and Middleton, 2003; Brown and Duguid, 1996; Dewhurst and Cegarra, 2004). Elkjaer (1999) agrees, as an increase in work looking at the learning organization and organizational learning, considers learning as situated in practice. Whilst this theory is seen as important, it is argued that other theories from the area of social learning, which complement communities of practice, should also be focused upon. So far the work of Kolb (1984) has been taken into account (as used in Chapter Two to investigate the learning potential of three soft methodologies), and how an individual's experiences relate to learning; but other theories that this section considers that could be of value are now only just starting to be reviewed (e.g., Cheetham and Chivers, 2001; Ghosh, 2004).

The problem that the area of learning faces is identified by Wenger (1998) when he acknowledges that many learning theories exist. Each of these theories can be based on issues relating to individuals, how the world is perceived, and a combination of these two issues (Lave and Wenger, 1991). Different theories can be used to take account of very different aspects (Wenger, 1998). This is no more emphasised than by checking the TIP (theory in practice) website (<http://tip.psychology.org/>) where fifty theories relating to learning can be found. Nevertheless, as Lave and Wenger (1991) and Wenger (1998) emphasise, which learning theory is relevant depends upon what aspects are viewed, and how the nature of knowledge and knowing is seen. The learning theories that are argued to add value to learning within organisations for this work come from Bandura (1977, 1986), Vygotsky (1978), Lave and Wenger (1991) and Wenger (1998). These theories take a perspective on learning as being a 'social' process. The starting point for examining this social aspect, is a paper by Cohen (1996) writing within the learning organization field, which considers individual learning, and how it relates to organisational routines (Small and Irvine, 2006).

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The purpose of Cohen's (1996) paper was combining the work done in the organizational learning field with work being undertaken in the area of skilled performance in psychology (Small and Irvine, 2006). Cohen (1996 p188 – 189) cites Stinchcombe's earlier (1990) work and concludes that the structure of an organisation *"is viewed as a design for organizational learning, for acquiring information about the state of the world, and for improving what organisations can do."* The skills of the individual members of the organisation make up the very basis of an organisation's capabilities. It is believed that how these skills are used, and developed in the presence of other individuals, is of importance. This section synthesises three learning theories that are argued to be commensurate with one another and can help undertake SSM with a greater focus on the learning the approach can promote.

### 3.3.1 Social Learning Theory

Human behaviour can be described, as resulting from motivation that comes from within an individual, through vicarious needs, instincts, impulses, and drives (Bandura, 1977, 1986). The problem, Bandura (1986) proposes, is that the drives are linked to behaviour change. Consistency in motivations may relate to the individual anticipating the outcome of different events, and in response, maintaining the most appropriate behaviour (Bandura, 1977). For example, observing an individual at work may show a consistency over a period of time (Bandura, 1986). This consistency of motivations may provide an insight and a model to other individuals undertaking similar tasks within an organisation. Cheetham and Chivers (2001) agree when they argue that observation is part of life, and it can be taken that individuals learn skills through observation. Learning could be seen as an individual incorporating consistent behaviour from other people as a form of knowledge (Lave and Wenger, 1991). But examining the process in this way could be seen as separating the learner from the world, without looking at the process within the world (Lave and Wenger, 1991). It is issues such as these that have caused much discussion about learning.

Bandura (1986) continues by stating that an individual's behaviour may depend upon the setting (for example at home, or in other social settings) and this could be argued to support Lave and Wenger's (1991) argument. Firstly, implying that certain drives

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can be encouraged within an individual may depend upon the place where the drive is encouraged (Bandura, 1986). Secondly, studies have shown that individuals using cognitive aids can obtain and retain behavioural capabilities more successfully than by experiencing the performance many times over (Bandura, 1986). Using a strategy of pure observation to undertake a task may not be as successful as using aids that individuals can use or refer to. Bandura (1977) uses the example of television being a more powerful model to hold attention, than placing the same information into a programme only using displays in a written format. These and many other issues related to learning within the climate of an organisation must be taken into account. In order to investigate these issues, and factors that influence them, Bandura (1986) has developed a model based on triadic reciprocity.

#### 3.3.1.1 Triadic Reciprocity

The model of triadic reciprocity shows that behaviour, cognitive factors, personal factors, and the environment combine, to interact and influence each other. Bandura displays this as a model as shown in Figure 3.4.

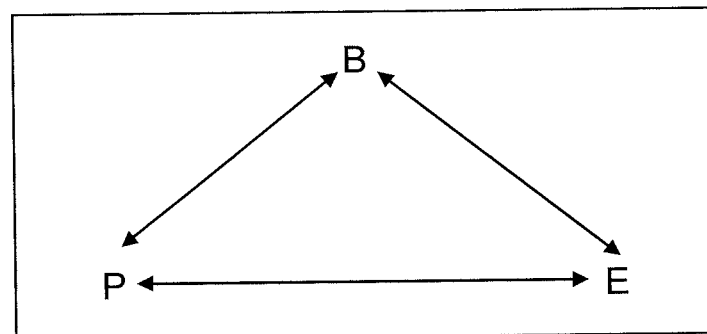


Figure 3.4

*Schematisation of the Relations between the Three Classes of Determinants in Triadic Reciprocal Causation*

Source: Bandura (1986 P24)

Figure 3.4 shows the three relations as personal factors (P), behavioural and cognitive factors (B) and environmental factors (E) and their interaction. The theory and model (Figure 3.4) use the term ‘reciprocal’ to mean the “*mutual action between causal factors*” and the term ‘determinism’ to mean “*the production of effects by certain factors*” (Bandura, 1986 p23). It is important to note that Figure 3.4 does not imply an equal strength of each of the three influences (Bandura, 1986). Bandura (1986)

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goes on to add that the three factors will vary through activities, individuals, and circumstances. The work of Bandura (1986) has been used to highlight the effects of learning as stated from areas such as web based distance education (see Dailey, Carey and White, 1999) and other technologies designed to aid individuals learning capabilities. It is argued that the triadic reciprocity model can be used in this research to inquire how individuals within teams could use any expansion to SSM to solve specific problems and design and implement an IS. The three classes of determinants consequently should be further explored.

#### **3.3.1.2 An Examination of the Three Classes of Determinants**

This section will provide a brief overview on the three classes of determinants and their role in the reciprocal causation model. If an individual experiences an environment where that individual's behaviour becomes constrained, the environmental condition will become the dominant determinant (Bandura, 1986). Bandura (1986) uses the example of an individual playing the piano, to demonstrate how behaviour may become the dominating force in the model. Playing the piano, for individual pleasure, can be described as self-regulative through the effects the instrument produces (Bandura, 1986). The self-regulating behaviour is dominant during the period of playing because other factors such as situational and cognitive processes are not required as much (Bandura, 1986). Personal factors can become dominant through the following example. Bandura (1986) considers the selection of a book from a library. The choice of the book depends upon an individual's preference (Bandura, 1986). It can be argued that the personal factors were dominating, as the environmental and behavioural aspects were not called upon. Bandura (1986) concludes by stating that personal factors seem to dominate when individual's situational constraints are weak. Examining issues such as current environment, behaviour, and personal and cognitive factors may help with identifying more suitable learning conditions faced by individuals. Identifying which factor is in effect may not be so straightforward.

Bandura (1986) argues that when an individual activates defensive behaviour (cf. Argyris and Schön, 1978, 1996) it is the cognitive factor that has the most influence over the individual. Incorrect beliefs can cause an individual to produce behaviour that does not allow the actual reality to be perceived; the reciprocal interaction of

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beliefs and action are enforced, shielding an individual from an environment, where a correction may be made (Bandura, 1986). Just because the example described shows an interaction between all three factors (behavioural factors, cognitive and personal factors, and environmental factors); one factor may not essentially influence the others reciprocally. Bandura (1986) believes that most of the time, factors are very independent. Within each of the three factors, other factors can be at work (Bandura, 1986). For example, within the behavioural factor, a lot of actions can be related, which either can positively or negatively influence behaviour as it occurs (Bandura, 1986). The environmental factor can be as similar to the behavioural factor, as the environmental factor can interact with a setting, which ultimately causes other changes within that environment; and the personal and cognitive factors allow the process to grow (Bandura, 1986). What is meant through this growth process, is that thoughts can increase reciprocally. One example is of an individual thinking frightening thoughts. These thoughts stir turmoil, within the individual, which in turn increases the frightening thoughts (Bandura, 1986). It is not the purpose of this section to go into great detail on each of the determinants but to demonstrate that by trying to identify such processes, within a group or team of individuals, it could aid the use of SSM. The section so far has given an overview of factors contributing to the triadic reciprocity model. For a more detailed discussion on triadic reciprocity and each of the three determinants (personal factors, behavioural and cognitive factors and environmental factors), readers are referred to Bandura (1986).

It is argued that Bandura's (1977, 1986) work provides a very useful start in looking at improving processes, to enhance an individuals effectiveness when using the SSM framework and how it could be expanded. Bandura's (1977, 1986) work can also be used to see other tasks within an organisation. For example, providing more encouragement, support, or a quiet area to work, as well as considering how an individual actually can improve themselves. Lehesvirta (2004) states knowledge is argued as being created from the interchange of the environment, the individual, and the relationship between the two. From this thinking and to complement Bandura's (1986) work, the work of Vygotsky (1978) through his "Zone of Proximal Development" (ZPD) can be viewed. Vygotsky's (1978) work focuses upon the social aspect of learning, but while Bandura's (1986) work could be considered through one individual, and how the three determinants can affect the individual,



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Vygotsky (1978) inquires into how an individual can learn when they are placed in a situation with another individual. Bandura (1977) considers that being able to copy another individual allows the spread of new ideas and other practices from the individual to a group, or further. The stance adopted is that both Bandura (1977, 1986) and Vygotsky (1978) are right, which is why communities of practice are considered to be another useful social learning theory. It is believed that where Bandura (1977) might regard the individual to the group, Vygotsky (1978) focuses more upon how the transfer that takes place in modelling and other forms of knowledge is an important aspect of learning, especially when viewed from within an organisation. This can be summarised by Tu (2000) when he proposes that interaction between learners and models (individuals) is required for learning, as if there is no interaction there can be no learning.

#### **3.3.2 The “Zone of Proximal Development”**

Complementary to Bandura’s (1977, 1986) social learning theory, Vygotsky (1978) developed the “zone of proximal development” (ZPD) as an explanation of cognitive development within an individual. The cognitive development occurs within the zone of proximal development (Vygotsky, 1978), which it is argued can be underpinned by social learning theory, as it shows learning to be achieved through interacting with ‘experts’ in a suitable environment (Ghosh, 2004). This perspective considers learning being undertaken through co-operation with another individual (Cheetham and Chivers, 2001). It is important then to understand why an individual enters the ‘ZPD’, if it can be planned, and what does it entail.

Both Vygotsky (1978) and Lave and Wenger (1991), consider the joining and undertaking of an activity with language as important. The importance of language was discussed previously, but Bandura (1977) emphasises this point again by adding that symbols, as well as verbal communication, are a way to deal with the environment. This forms what Weick (1995) argues as language relating to action. Barrett (2002) can be seen to support this, as she states communication as a key point in organisational change, as well as a form of glue that holds the organisation together. Lines (2005 p161) summarises these points by stating, “...*organizational learning occurs primarily through the sharing of experiences and dialogues among different individuals in a social learning system.*” This provides a link back to

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learning organization thinking, as dialogue and language development were argued to apply, and as Vygotsky (1978) and Lave and Wenger (1991) argue, they are also part of general learning.

Vygotsky (1978) articulates, “...*the most significant moment in the course of intellectual development, which gives birth to the purely human forms of practical and abstract intelligence, occurs when speech and practical activity, two previously completely independent lines of development, converge.*” Undertaking speech allows an individual’s mental models to be made explicit, allowing new mental models to be developed, which requires the use of past and present knowledge (Ghosh, 2004). For example, Vygotsky (1978) takes account of the appeals of a child who is trying to complete a task. The child, by asking a question, implies that a plan has been developed to complete the task, but is unable to complete the task without assistance from another person (Vygotsky, 1978). It is this assistance that is seen as important. Pauleen, Marshall and Egort (2004) agree but look to Kolb’s (1984) experiential learning model as a way to undertake collaborative team learning. This may imply that individuals are involved in another’s learning even if it is unknown precisely how.

While not going into great detail on what theories that Vygotsky (1978) examines to arrive at the perspective of viewing learning taking place through the “ZPD” (see Vygotsky, 1978 for more detail), these can be summarised as:

- Learning pursuing development (e.g., development must exist before learning can take place (Vygotsky, 1978)).
- Learning being related to development (e.g., the ‘reflex’ theory taking account that learning cannot be separated from an individual’s development (Vygotsky, 1978)).
- Joining the first and second points together (e.g., combining the perspectives of development and learning which makes “...*the idea that two processes that make up development are mutually dependent and interactive*” (Vygotsky, 1978 p81).

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Upon reviewing all three theories, Vygotsky (1978) rejects all three approaches but adds that the discussion has allowed the relationship between development and learning to be taken account of. In trying to solve this problem, Vygotsky (1978) cites learning and development, and the specifics of the relationship between learning and development, as two issues that need addressing. He argues the zone of proximal development as a solution to this problem.

Vygotsky (1978) explains the ZPD by using the example of two children who are aged ten years of age, but possess the mental development of eight years. Vygotsky (1978) adds that both children are both the same age mentally, and can deal with activities that have been assigned to eight years olds, but nothing beyond this range. Vygotsky (1978) continues by investigating what happens when each child is provided with assistance to complete the task: through adult help which includes demonstration of the activity, starting the activity while the child completes it, or providing guiding questions, to name just three. Vygotsky (1978) then asks that if the first child can complete activities associated with a child of twelve years, whilst the second that of a nine year old, if the two children are still the same mentally. Vygotsky's (1978) simple answer is no. It is this difference between the child's mental age, and the age the child attained with assistance, that is the zone of proximal development (ZPD) (Vygotsky, 1978). Vygotsky (1978 p86) describes the ZPD as "*...the difference between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers.*" Vygotsky (1978) continues by explaining that the ZPD allows processes to be undertaken that will be possible in the near future, but are not possible at the current time. Described another way, the actual development level relates to the past mental development of an individual, while the ZPD looks at the future mental development level (Vygotsky, 1978).

What should be remembered is that an individual can only copy, and eventually understand activities that are within their development level (Vygotsky, 1978). As Ghosh (2004) explains, once processes have been grouped by the learner, they are part of that learner's development, which can be used for future development of more complex activities. In relation to this research, an individual may need to understand

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issues that an IS will need to include. If these issues go unexplored, the IS may be classed as a failure due to the IS not meeting the requirements. Through entering the ZPD, an individual may be able to learn from a more capable individual on issues that are important and need to be taken into consideration. Through using SSM, this learning could be found through the processes the approach promotes. The ZPD could be used to examine learning as it takes place through the design and development phases.

The zone of proximal development is a theory of learning considered to help expand an individual's capabilities, through the help of another more capable individual, as long as the individual is able to reach that level in the future. The aiding process is seen as a good way to see learning within organisations being undertaken, or as this research focuses upon, using learning to design and implement ISA. For example, a team of individuals within a department may wish to develop a technology to solve a particular problem. These individuals may not have the capabilities to design or request specific aspects of the IS required. An individual who has these capabilities, such as an IS specialist, may be able to help the individuals of the team, through engaging in the process Vygotsky (1978) describes as the zone of proximal development.

It is argued that the work of Bandura's (1977, 1986) social learning theory, and how they can influence learning, as well as Vygotsky's (1978) zone of proximal development on how individuals can learn, could be used to look at the design and implementation of ISA within an organisation. The work of Glassman (2001) can be used to show a link between Vygotsky (1978) and Bandura (1986), even though he was carrying out a comparison between Vygotsky (1978) and John Dewey. Glassman (2001) summarises the link between Vygotsky's (1978) work as using the social environment to build processes that can enhance an individual's ability. How the environment takes effect can be linked to personal factors and behavioural and cognitive factors within the triadic reciprocity model, which then could affect the ability of the zone of proximal development. The reason why Bandura's (1986) work, as well as Vygotsky's (1978) is discussed is stated by Billett (2004). Billett (2004) views learning as being achieved through a combination of individuals, knowledge, and other social sources. This implies learning is the process of engagement socially,

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which is greater than the individual interactions that Vygotsky (1978) discusses, but also relates to the workplace. With the first two issues already discussed, how learning can be achieved within the workplace also needs to be examined. This can come from work on communities of practice (COPs). This is the final theory of learning which can be applied to this work as it considers the relationship between a group of individuals, and the effects that the dynamics of the group can have on the previous two theories.

#### **3.3.3 Communities of Practice**

This work has adopted a position through Bandura (1977, 1986) and Vygotsky (1978), on how learning could be regarded within organisations. These two theories regard the ‘social’ aspect of learning, as individuals within organisations do not work in isolation, or with just one individual, and regularly come into contact with many other individuals. This final theory has been adopted the most within the learning organization field (see Brown and Duguid, 1996) as a way to enhance organizational learning. Taking Vygotsky’s (1978) thinking, the more individuals that come together to collaborate on problems, the higher the quality of learning that could be achieved. This collaboration firstly, could depend on the structure and culture of the organisation (see Schein, 1994), and secondly upon the individuals themselves being aware of personal, behavioural, cognitive, and environment factors, which Bandura (1977, 1986) discusses. Individuals may not want to formally collaborate and share learning, which could be an individual or cultural aspect of a particular organisation. Not all individuals may take this perspective and by collaborating with other individuals, projects and other organisational functions can be undertaken more effectively.

Lave (1988) describes a process that may encourage this collaboration more effectively than trying to undertake this task formally. Lave (1988) describes learning as ‘situated’, or in other words occurring through the activity or context and culture where the activity takes place. The interaction that occurs is a key concept in this situated learning process (Lave, 1988). Elkjaer (1999) notes that when learning is considered as situated within social practice, learning organizations and organizational learning undertakes a different epistemology. The situated learning process is characterised by Lave and Wenger (1991) as legitimate peripheral

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participation. Lave and Wenger (1991 p29) explain this participation by stating that “...*learners inevitably participate in communities of practitioners and that the mastery of knowledge and skill requires new comers to move toward full participation in the socio-cultural practices of community.*” The participation of members in the community has to be undertaken if knowledge is to be successfully shared throughout a community (Ardichvili, Page and Wentling, 2003).

The social interaction of individuals can be described as a community of practice (Lave and Wenger, 1991; Wenger, 1998). This section will now review this and other aspects of communities of practice, including why COPs are argued to be applicable for learning in general, and related specifically to designing and implementing ISA. Wenger (1998) points to a variety of organisations, or as he regards them, ‘institutions’, as taking account of learning primarily as an individual process undertaken in isolation. Wenger (1998 p4) looks at learning as a part of human nature and has four points that he believes are related to learning namely:

- “*We are social beings. Far from being trivially true, the fact is a central aspect of learning.*
- *Knowledge is a matter of competence with respect to valued enterprises – such as singing in tune, discovering scientific facts, fixing machines, writing poetry, being convivial, growing up as a boy or a girl, and so forth.*
- *Knowing is a matter of participating in the pursuit of such enterprises, that is, of active engagement in the world.*
- *Meaning – our ability to experience the world and our engagement with it as meaningful – is ultimately what learning is to produce.”*

From the above four points, Wenger (1998) argues for learning through social participation. He continues by adding that the participation he refers to relates to participants becoming active within a social community as well as building an identity within the community. Or as Lave and Wenger (1991) have stated, learning is not just located within practice as an independent process, but part of the practice within the world where learning is taking place. Wenger’s (1998) social theory of learning incorporates what he argues is necessary to shape ‘social participation’. What a

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community of practice actually is will now be examined with reference as to how it can be applied to this work.

Wenger, McDermott and Snyder (2002 p4) propose that “*communities of practice are groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an on-going basis.*” A community of practice (COP) also incorporates collaboration between members and mutual trust (Dewhurst and Cegarra, 2004; Ghosh, 2004). The areas that Wenger (1998) puts forward as defining communities of practice, or shaping this social participation include meaning, practice, community, and identity. These issues enable legitimacy of participation with old experienced individuals, with new individuals becoming part of the practice (Hildreth, Kimble and Wright, 2000; Lave and Wenger, 1991). It should be noted that when Wenger (1998 p5) discusses the four areas, he states each as being enacted using ‘*a way of talking about*’; so each is undertaken in a shared language or discourse. A model of the four components can be seen in Figure 3.5.

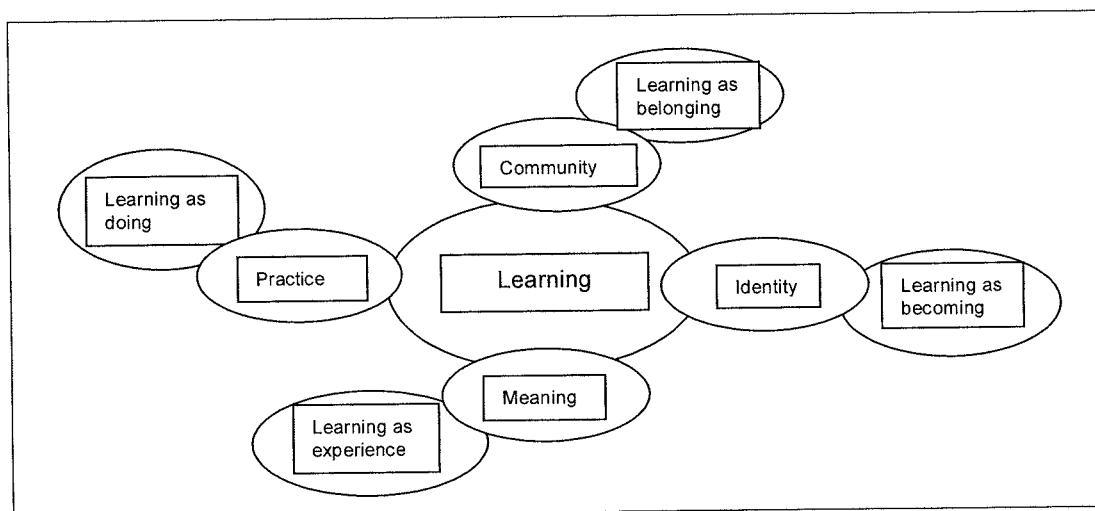


Figure 3.5  
*Components of a Social Theory of Learning*  
Source: Wenger (1998 P5)

Wenger (1998) declares the processes within Figure 3.5 are linked and share the same relationship. By considering learning as taking place in this context, the usefulness of the theory should be noted when seeing work being undertaken within an organisation. As Wenger (1998) himself admits, this participation has a variety of

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associations for individuals, the communities they are related to, and organisations. Brown and Duguid (1996) point out that very complex tasks can be undertaken without much understanding. This may be why many individuals do not pay much attention to theories such as communities of practice. Wenger's (1998) book goes on to discuss each of the components of his social theory of learning. He separates his book into three sections, firstly addressing practice (which includes meaning), and then focusing upon identity (which includes practice) before considering both parts together. Readers are recommended to read Wenger's (1998) book for a description of these issues, as it serves no purpose repeating them here. An appendix (Appendix B) is included giving a summary drawing heavily on Wenger's (1998) work. In this chapter, each element of Figure 3.5 will be highlighted as an overview before going on to discuss the centre of Figure 3.5, and what learning within a community of practice relates to. Appendix B will give an overview of why a community of practice (COP) needs all four components to achieve learning (Wenger, 1998; Wenger, McDermott and Snyder, 2002).

*Practice:* The process of practice relates to 'doing' and contains both tacit and explicit concepts which relate to being part of a community (Wenger, 1998). Practice involves acting and knowing together as well as language development (Wenger, 1998). A community needs to understand what issues are related to the domain of each practice, and what they each can achieve (Wenger, McDermott and Snyder, 2002).

*Meaning:* Wenger (1998) explores meaning through 'practice as meaning'. This examines meaning as being undertaken through four processes, namely negotiation of meaning, participation, reification, and linking participation and reification. The issues that make up meaning highlight the difficulty that managers could face when trying to formally manage a community of practice.

*Community:* When Wenger (1998) associates practice with community, it is not the same as considering a community as having practice. When the terms 'community' and 'practice' are placed together it achieves two things: firstly, a more manageable aspect of the term 'practice', and secondly, allows a special form of 'community', which is stated as a 'community of practice' to be undertaken (Wenger, 1998). A



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community of practice is where all individuals that participate do so on multiple levels (Lave and Wenger, 1991). For a community to be engaged with practice, three processes allow the practice elements to be achieved; these are the processes of mutual engagement, a joint enterprise, and a shared repertoire (Wenger, 1998).

*Identity:* Wenger (1998) highlights the process of identity occurring within practice, meaning, and community. When Wenger (1998) refers to 'identity', he inquires into how an individual builds their identity through negotiated meaning of that individual's experience, in being a member of a community. Wenger, McDermott and Snyder (2002) consider communities of practice to develop over time in a way that allows them to understand their topics, develop common practices to generate knowledge, as well as the practice itself, which in turn allows relationships to develop and a sense of identity to form. When looking at identity there is no point in focusing on the individual or the community, but on the structure of both (Wenger, 1998). *"In this sense, the formation of a community of practice is also the negotiation of identities"* (Wenger, 1998 p149). Issues related to identity include: negotiated experience, community membership, learning trajectory, nexus of multi membership, and the relation between the local and the global (Wenger, 1998).

The four issues discussed, whilst only summarised, show that a community of practice is difficult to formally manage and requires more than a group of individuals coming together. Learning is argued to be undertaken through these four processes (Practice, Meaning, Community, and Identity), therefore the next section focuses on this issue of learning.

### 3.3.3.1 Learning

*"Learning cannot be designed: it can only be designed for – that is, facilitated or frustrated"* (Wenger, 1998 p229). Learning is at the centre of Figure 3.5 and the other four aspects (summarised above) of the model are linked. Whilst Wenger (1998) deals with learning quite early on in his book, this has been left until last. How learning is achieved is argued as being important, even though Wenger (1998) believes each process is required, and could be substituted and placed in the centre of Figure 3.5 with the model still making sense. Hildreth, Kimble and Wright (2000) regard the processes that make a community of practice being as part of defining the

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other processes, and not able to be taken account of on their own. This can be best summarised by Revans (1998 p14) when he states that “*there can be no action without learning, and no learning without action.*” The reason why Wenger (1998) discusses learning in the first part of his book is because he views learning as taking place through practice. By undertaking practice, individuals can be considered to be investing in learning and identity (Wenger, 1998). To try and see learning in quantitative terms, Revans (1998) has developed the learning equation, where programmed knowledge (P) is taken and formally questioned (Q). This equation is written as:  $L = P + Q$  (Revans, 1998 p4). While Revans (1998) declares action learning as an approach to undertake this questioning process, the process is considered as being undertaken through a community of practice.

Wenger (1998 p86) states, communities of practice can “*...be thought of as shared histories of learning.*” The histories Wenger (1998) refers to involves two processes discussed within meaning, namely reification and participation. Through history, reification allows the past to be remembered and forgotten, using an open ended form to generate meaning (Wenger, 1998). Participation allows remembering and forgetting through memory, as well as help shape an individual’s identity, and their perception of what this was like in the past (Wenger, 1998). Viewing the interaction of reification and participation, through the process of practice, allows individuals to remember the past and forget the past; but it is also how an individual connects to their history along with objects created by other individuals (Wenger, 1998). Wenger (1998) believes that taking account of participation as being how learning is undertaken is not just a better style of learning, but is more epistemologically acceptable.

Wenger (1998) discusses practice as a shared history of learning, but not a stable entity requiring the processes of mutual engagement, joint enterprise and a shared repertoire (discussed above within community), where the whole process becomes an occurring structure that is not fixed. As a community is constantly being exposed to the world, it is required to continually re-invent itself (Wenger, 1998). A community can do this through mutual engagement, joint enterprise and a shared repertoire in the context of learning in practice (Wenger, 1998).

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Lave and Wenger (1991) express that whether these issues come about through language, or undertaking the activity, it is the practice that is important in undertaking learning. An individual may not perceive this as learning when comparing what learning conjures up in a 'school' context. Wenger (1998 p95 underline is the emphasis in the original) explains, "*one reason they do not think of their job as learning is that what they learn is their practice. Learning is not reified as an extraneous goal or as a special category of activity or membership.*" Undertaking these activities may contribute to a view of why learning is not being considered as happening, as this is what the job of an individual entails (Boud and Middleton, 2003). In this research, it is proposed by expanding the SSM framework this engagement could be facilitated. Through achieving this engagement allows what Wenger (1998) states as learning being the process of developing practices and negotiating meaning through these processes.

While it has been noted that the learning organization points to communities of practice as being important, this topic has not been lost within the field of IS. Ciborra (1999) considers communities of practice as being responsible for undertaking routines to offset the inadequacies of formal routines required in organisations. Ciborra (1999) goes on to identify communities of practice as a place to access knowledge. With this perspective, communities of practice may be formed at the design stage to carry out an expanded SSM framework that will be developed, and other communities of practice developed through the use of the technology. If individuals require help from other people who may be part of the community, but who are difficult to reach (i.e., geographically or through an organisations hierarchy) it can restrict learning. Consequently, encouraging learning can relate to access to communities (Brown and Duguid, 1996). Participation is investigated through 'mutual recognition' (Wenger, 1998). By viewing mutuality and participation a form of identity is created, which when recognised allows individuals to "*become part of each other*" (Wenger, 1998 p56).

To sum up communities of practice, and their existence, Wenger (1998) discusses sharing what competences have been gained with newer members over time, for which practice is further developed. With problems being solved, other newer problems appear that offer a community different problems to solve; for example, the

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introduction of ISA – but as newer members join the community they bring new thinking, which allows the community to grow (Wenger, McDermott and Snyder, 2002). Wenger, McDermott and Snyder (2002) highlight the requirement that communities need attention if the potential they foresee is to be reached. As no real answer is given as to how to measure and manage communities, Wenger, McDermott and Snyder (2002) believe that senior managers should try and integrate a community into the organisation.

#### **3.3.4 A Summary and Review of the Commensurability of the Three Learning Theories which could be Used to Help Facilitate any Expansion to SSM**

If a learning approach is to be incorporated into a soft methodology for the design and implementation of ISA, this research argues that the theories developed by Bandura (1977, 1986), Vygotsky (1978) and Lave and Wenger (1991) and Wenger (1988), can add value in trying to identify and understand learning with relation to using an expanded SSM framework. Two issues are highlighted to support this thinking. As has been emphasised elsewhere (Chapter Two), individuals should be involved with the design (Stowell and West, 1994) and implementation of an IS. For this to be achieved, a number of individuals have to come together to take account of the many different perspectives that need to be explored, if a suitable technology is to be designed and implemented within an organisation. All three theories could be used to identify where and how individuals meet and discuss issues, and what the outcomes of specific activities undertaken within an ISD project are. The three theories could be used to examine how the technology is used, and if the aims of the ISA are being met. Finally, an ISA that has not been designed specifically to aid learning could provide issues to a group of individuals, which could be formed ‘off line’, with relation to the ISA, where learning may also occur.

If an individual is allowed to develop their personal and cognitive factors in a suitable environment (the organisation and its culture perhaps), then a greater chance of learning could be achieved. This reason could lead the argument that considers information systems as a potentially suitable environment to provide these conditions. If an ISA can be implemented by taking account of these issues, individuals may be able to provide the organisation with the basis for creating organizational learning or forming a community of practice. Bandura’s (1986) model may be a start in

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investigating this process. If learning organization thinking is to take account of the foundations of the triadic reciprocity model, then focusing solely upon one of either environmental factors, personal, cognitive, or behavioural aspects, may not help from the perspective of triadic reciprocity. Neither will focusing upon one or two aspects out of the three determinants. This is the problem that Bandura (1986) seems to emphasise. An individual or manager of a team, who may be using an expanded SSM framework to draw out the thinking of the learning organization or use organizational learning techniques, may be able to identify issues through Bandura's (1986) model. Determining which effect dominates may be a difficult task. By trying to influence the factor of environment that is used, in conjunction with an expanded SSM framework a start may be made in seeing what issues work, and what provides disappointing results.

When individuals come together to work on unstructured problem situations, modelling human activity systems, as well as trying to draw out learning organization thinking, the processes that make up the outcomes need to be undertaken. Vygotsky's (1978) 'ZPD' could be useful for this task. For example, an individual will have knowledge of how to undertake their role within the organisation as well as the issues involved. Other individuals, in comparison, may not be aware of such issues. When individuals collaborate, this learning could be transferred to another individual, so that the secondary individual learns about the issues the first has knowledge of. An individual can learn about other issues within their development capabilities, as well as explore these issues through an expanded SSM framework. These theories are argued as important, because individuals do not stand by and view social aspects referring to learning processes of either a project or their work, but are involved in these processes (Lines, 2005). As this is the case, individuals display enthusiasm, disobedience or other behaviours when particular issues are faced (Lines, 2005).

It can be advantageous to investigate why an individual acts in a particular way. Vygotsky's (1978) work may primarily consider the ZPD as involving only a limited number of people (as a teacher – student relationship); communities of practice examines a larger group of people. Whilst each of the three theories face criticisms (e.g., Illeris, 2003) combining the three, is seen as more useful than adopting one single approach. Cheetham and Chivers (2001) support this point, as their research

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into how professionals acquire their competence found that in some instances, one theory of learning can be identified, but in another instance, a different theory could be viewed. Relying on one theory could provide this research with limitations. This is why three complementary theories were sought and identified.

Communities of practice, as discussed by Lave and Wenger (1991) and Wenger (1998), propose that a community of practice cannot be managed. A project team may not count as a community of practice as they are usually controlled. If the individuals that make up the team believe that there is a lot of value in the potential process and outcome for the project, the seeds of a community may form. As has been reviewed, a community changes over time, and the history of a community is important and has to begin somewhere. It can be argued that using the framework may bring a community together, even if this community does not fulfil a community of practice at present. With this thinking, it is argued that learning can be undertaken through expanding SSM, with an attempt to see this learning through the theories discussed. If learning is taken as an end product of such a process, knowledge is perceived to be related, and how knowledge is produced needs to be reviewed. This is especially important if the knowledge is to be structured within an IS.

Brown and Duguid (1996), and Sense (2005), reject models of learning and knowledge management that look to separate the generation of learning or knowledge from the practice, as they see learning as a social construction. The three theories reviewed fit into this epistemological thinking, which implies their commensurability. Pauleen, Marshall and Egort (2004 p92) also agree, when they comment that *“learners can generate knowledge and experience through their own efforts.”* The authors continue by considering this form of learning as being suitable when IS are involved (Pauleen, Marshall and Egort, 2004). If these theories are seen as how learning can be undertaken, and knowledge is generated through practice, the literature should also inquire how knowledge is generated. It is not helpful to divert attention away from the main focus of this research, but however it should be noted that knowledge is deemed to play a role in learning. A numerous number of writings have been dedicated to this area (e.g., Adams and Freeman, 2000; APQC 1997a, 1997b; Boland, 1987; Davenport and Prusack, 2000; Dewhurst and Cegarra, 2004; Drucker, 1995; Gibson and Vermeulen, 2003; Kock, McQueen and Corner, 1997;

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Kransdorff, 1998; Kulkki and Kosonen, 2001; McAdam and McCreedy, 2000; Nonaka and Takeuchi, 1995; Polanyi, 1966; Preskill and Torres, 1999; Stonehouse and Pemberton, 1999; Von Krogh, Ichijo and Nonaka, 2000) and readers are directed to these. What is important for this research from reviewing the literature on the learning organization, organizational learning and learning theories, is how these areas can help expand SSM to further draw out the learning approaches that this work is calling for and trying to develop.

#### **3.4 Summary**

The previous chapter identified SSM as a very suitable approach that can be used to generate learning activities through issues of encountering problem situations, which IS may possess. This chapter set out to explore the relationship between 'learning' and 'an organisation'. This chapter has explored the call from others such as Ormerod (1995), by incorporating other thinking that could be incorporated into the SSM approach. The learning organization was considered as one area of thinking that could be used. Even though this field faces many problems, these relate to how to build a learning organization or undertake organizational learning, as well as the difference between the two.

While individuals undertake learning, the learning organization and organizational learning do provide theories (whether accepted or not) that individuals can undertake to encapsulate the processes of change and collaboration, which is stated to help individuals and the organisation evolve. Other programmes have been used in the past to try and build learning organizations, but the emphasis has not been on 'learning' or allowing individuals to discover issues for themselves; focusing mainly on a class room style of learning, as encountered within educational institutes. It is argued that by expanding a soft methodology incorporating thinking from the learning organization can add legitimacy to learning that senior managers may approve of, in comparison to the more ad-hoc approaches that the learning organization and organizational learning may be considered to offer. To aid with, and enhance the use of a soft methodology, a number of learning theories are argued to add value in enhancing learning further. These theories were Bandura's (1986) social learning theory, Vygotsky's (1978) zone of proximal development and Lave and Wenger (1991), and Wenger's (1998) communities of practice. It is proposed by attempting to

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see these learning theories in practice with any expanded soft methodology, can aid the learning available to individuals. Now that the learning literature has been reviewed (this chapter) and a soft methodology (Soft Systems Methodology) has been identified, an attempt to expand SSM is undertaken in the next chapter.



## Chapter Four: Expanding a Soft Methodology for the Design and Implementation of Information Systems Applications

### 4.0 Introduction

The literature reviewed in Chapter Two focused on the problems individuals within organisations may consider in relation to information systems (IS), as well as how IS could be designed and implemented. Whilst the identification of a soft methodology that this work can adopt has been stated, it was argued that this approach could be expanded to take into account the work of the learning organization (LO). It was proposed in Chapter Three, by focusing on this literature and incorporating the ideas and approaches the learning organization field promotes, can a learning approach be incorporated into a soft methodology for the design and implementation of information systems applications (ISA). The problem is that by expanding Soft Systems Methodology (SSM) the framework only deals with issues associated with problem exploration and IS design.

This chapter therefore, firstly discusses how SSM can be expanded to take into account learning organization conditions and how this modified framework can be used in practice. This framework was applied in practice with the outcomes being discussed and analysed as the first cycle of action research. Upon completing the expansion to SSM, the remainder of this chapter explores issues associated with IS implementation and IS management and how these issues can relate to the expanded SSM framework. These issues were drawn out from the second cycle of action research. It is important to highlight that the complete learning framework that was developed came from both theory and being applied in practice. The learning framework is being highlighted and discussed in this chapter as it is the main contribution to knowledge.

### 4.1 Expanding Soft Systems Methodology

It may be considered that altering, or using SSM in a different way may devalue the approach. Another author who has used SSM in a different way is Atkinson (e.g., Atkinson 1986, 2000). It is argued that altering SSM is acceptable, as Atkinson (1986

p19) states “SSM is an ideal type, a distillation from a number of users’ versions of such ‘soft’ methodologies, a genus covering various species of such methodology.” It is proposed that this ideal can be altered to firstly take into account the situation, but also the problem – which this research is addressing. Expanding SSM is not meant as a criticism of the approach (Small, 2005), but using learning organization thinking will allow the investigation into how well the expansion works, as well as help individuals within an organisation to generate further learning as an outcome of ISD and implementation, which is the purpose of the research.

The field of the learning organization can be seen as complicated, due to the debate around its existence, as well as the debate on how organizational learning relates to the learning organization, and how both approaches are undertaken. Whilst an attempt has been made to clarify these issues in the previous chapter through the various literatures, it is the individuals who learn on behalf of the organisation. Individuals then have to be exposed to each other in order to share the learning and experiences gained, if organizational learning is to be classed as having been undertaken. As the work of Argyris and Schön (1978, 1996), as well as Senge’s (1990) thinking has demonstrated, this may not be so simple. While these authors discuss a way they believe organizational learning and building a learning organization should be undertaken, it is argued that where the learning is undertaken, also needs to be considered. Mayo and Lank (1994) agree, as they point out that individuals within the learning organization need to have an understanding of what learning is, but state that this issue is not taken into account, especially as different people can learn in different ways. The problem is that whilst the field may acknowledge this, little attempt is made to examine this process in the same way as social learning theory (e.g., Bandura, 1977, 1986; Vygotsky, 1978). Nevertheless, it is argued that SSM can be expanded to take into account learning organization and organizational learning thinking, while the learning theories proposed can be used to enhance the learning that this expanded SSM framework is trying to achieve. Mavin and Cavaleri (2004) agree with this thinking, as they call for exploration of the learning organization through the lens of social learning.

While the theories of the learning organization can be incorporated into the SSM framework, it is the dialogue and language that a group of individuals create, through

use of the approach, which may be explored when considering how successful any expansion to the SSM approach using learning organization conditions is. As Revans (1998 p14) articulates, “*there can be no action without learning, and no learning without action.*” Utilising an expanded SSM framework can provide the action to help generate learning outcomes. The expanded SSM framework can be seen through Figure 4.1.

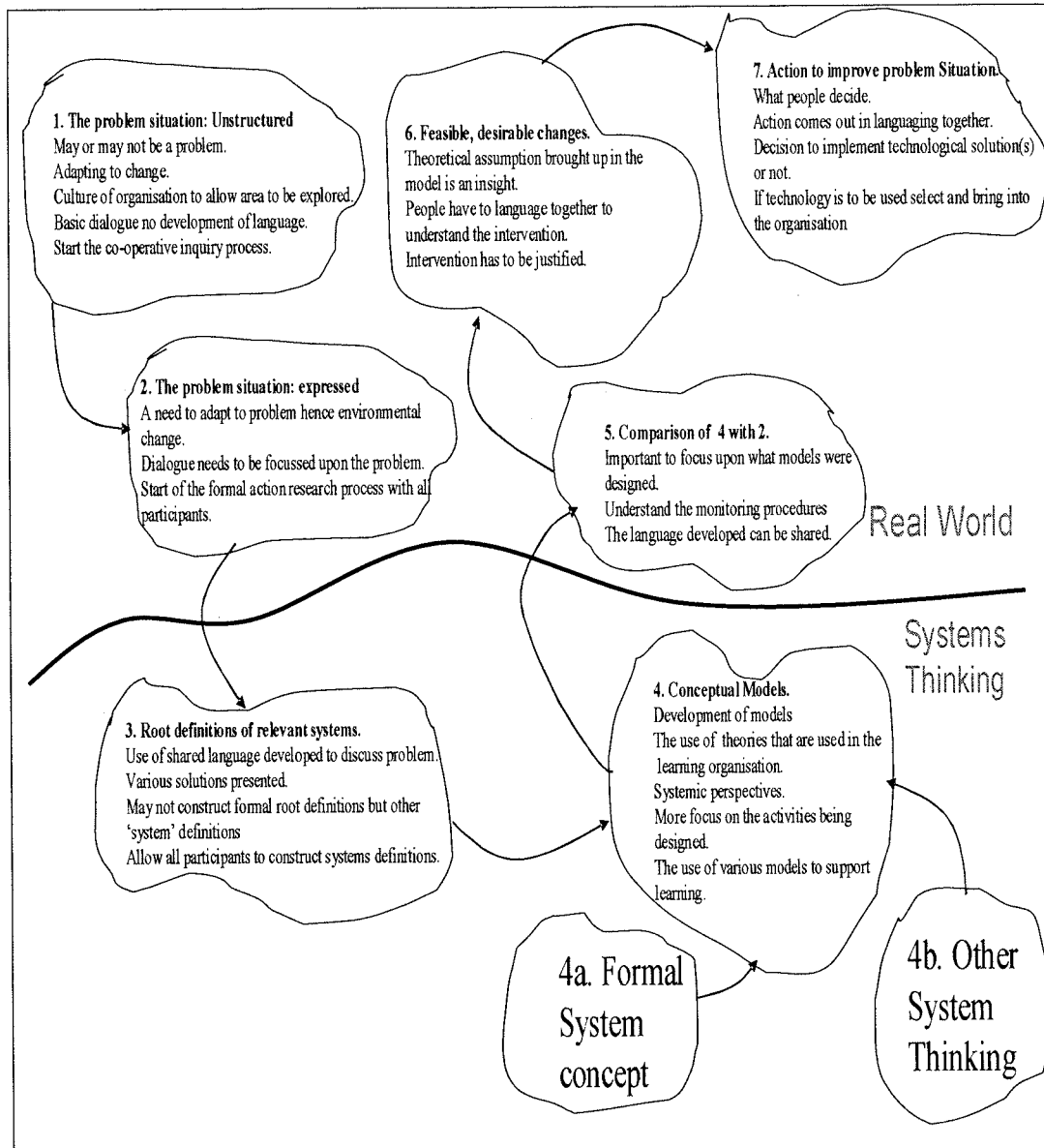


Figure 4.1

*The Expanded SSM Framework Developed for this Study*  
Adapted From: Checkland and Scholes (1990)

Figure 4.1 has expanded Checkland and Scholes's (1990) original Soft Systems Methodology, in order to take into account learning organization thinking, as

highlighted by the learning organization and organizational learning literature, and it is discussed in this chapter (Small, 2005). As this framework has expanded SSM to incorporate further learning opportunities, this framework will be labelled as SSM<sup>XL</sup> (Soft Systems Methodology eXpanded for Learning). It should be noted that the SSM<sup>XL</sup> has been displayed using the traditional seven stage SSM process. Doing this does not mean that the traditional model of SSM is stated as more appropriate; only that the expansion undertaken is easier to communicate in this form. Nevertheless, while an expansion has taken place, the original stages discussed by Checkland (1993) and Checkland and Scholes (1990) are still important, and are displayed in bold. Developing SSM<sup>XL</sup>, to encompass the stages as they are displayed in Figure 4.1, will provide a learning environment to develop solutions to one or a number of problems (Small and Sice, 2004), which for the purpose of this research is designing and implementing IS with an emphasis on learning.

Soft Systems Methodology expanded for learning (SSM<sup>XL</sup>) displayed in Figure 4.1 has tried to remove the emphasis upon being primarily practitioner led, and put the emphasis on increased collaboration between all participants. Participants may encounter a problem that needs to be tackled (Small and Sice, 2004) so emphasis of a co-operative aspect, that is similar to co-operative inquiry used by Heron (1999) and Heron and Reason (2001) is developed. This emphasis may allow the stream of cultural analysis that Checkland and Scholes (1990) examine to be lost in the original SSM approach. This is believed because when the intervention analysis is used throughout the inquiry, the individuals involved in the problem situation will be conducting the work. For example, at stage 1 of SSM, the problem situation is unstructured and data may be collected solely by a researcher or consultant about the organisation and the perceived problem. This is not the case with SSM<sup>XL</sup>. By taking into account Vygotsky's (1978) zone of proximal development (ZPD) it is argued firstly that researchers or consultants can help participants within an organisation learn about the SSM<sup>XL</sup> framework and the purpose it has been designed for. Secondly, by allowing participants to learn about the SSM<sup>XL</sup> framework, researchers and consultants can start to learn about the organisation and the perceived problems that need to be addressed. It is argued that from this early stage that the learning is more focused.

Individuals may come together to work on what they encounter is a problem that an IS will solve (stage 1). This is only one of many perspectives that need to be explored. There might not be a problem, but until all the issues are discussed and explored, this might not be determined. A team or other members have to be able to undertake an investigation together on behalf of the organisation; and the culture of the team or organisation has to allow the investigation, and if necessary change, to be undertaken. By examining the issues associated with Bandura's (1986) social learning theory (personal factors, behavioural and cognitive factors and environmental factors) the problematical issues associated with individuals and organisational culture could be better addressed and hopefully sow the seeds so a community of practice may form. For example, by looking at an organisations culture or how the organisation can adapt to change allows the environment, personal, behavioural, and cognitive factors to be explored. This in turn will hopefully allow the SSM<sup>XL</sup> to be used more successfully. Through undertaking this process, basic dialogue should hopefully be achieved and through this, individuals' theory-in-use may be able to be tested about why an IS is required, and how it is going to be used, as well as how the ISA will affect individuals of the organisation. This could stop ISA being implemented as a response to what has worked in the past, or because an individual thinks this would be the best strategy to adopt without exploring others.

On reaching stage 2, the problem situation is expressed. Tools such as rich pictures can be used to bring out individuals theories-in-use, or other client led approaches could be used (cf. Stowell and West, 1994). Other techniques could include interviews, or processes an organisation may already use, just as long as they allow dialogue and exploration processes to take place and focus on the softer issues. The systems archetypes which Senge (1990) proposes could even be used as a way to express the problem situation. What tools are used, as well as what strategies are adopted, should be discussed through the further developing dialogue of the team. It is argued that Senge's (1990) team learning discipline and Wenger's (1998) communities of practice can be useful in terms of evaluating and improving group dynamics. These learning theories may help focus and improve the team in undertaking this stage of the SSM<sup>XL</sup> framework.

Expressing the problem situation at stage 2 leads to the various models that can be constructed, based on perspectives of the 'system' under investigation. From the models constructed, they can be debated, which may reveal a change in individuals' theories-in-use. This may allow the problem situation to be further structured with more suitable models being constructed. If single and double-loop learning can be used within SSM, it may enable Argyris and Schön's (1978, 1996) organizational learning to be undertaken on some level, as well as improve the usefulness of SSM, as there is some framework (SSM<sup>XL</sup>) to attach the thinking to. The issue may relate to helping the individuals who are experiencing the problem to participate in the process. This may pose an issue, as they need to discuss their theories-in-use, in collaboration with the researcher, who will also have to be aware of his theories-in-use, if this form of organizational learning is to be undertaken. Or as Argyris and Schön (1978) state, changing the behaviour will require new maps, as well as developing a new language, which a consultant or researcher may be able to help with. It is these techniques of the learning organization and organizational learning, which will add value to SSM<sup>XL</sup>. What then happens if a researcher or consultant is not available to help with this process, or an aspect of the project, needs to be considered. Nevertheless, an attempt is made to bring out this thinking through stages 3 and 4.

At stage 3 SSM promotes the use of root definitions of relevant systems. It should be noted that attempts were made to make the root definition and conceptual model (stage 4) aspects of the SSM<sup>XL</sup> framework more straightforward, similar to Lewis (1994). It has to be understood by all participants that the language being developed is as important at this stage, as what systems definitions are being presented. It is argued that whilst formal root definitions are a key process in SSM, some participants may find them difficult to construct and/or confusing. Other potential problems of formal root definitions could be the tendency to cause arguments between participants and lead to win/lose games which Argyris and Schön (1978) argue are unproductive. In an attempt to reduce such problems, Bandura's (1986) theory of learning can be used to identify if participants' behaviour or personal factors are leading to an unfavourable environment which can reduce the learning that could be achieved by other team members. Possible alternatives to express root definitions may need to be found. Finally, it is argued at stage 3, formal root definitions may not be constructed,

as this may close off any other perspectives that may emerge from the development of models and reduce the learning that could be more beneficial overall.

At stage 4 of SSM<sup>XL</sup>, formal conceptual models may not be constructed, but other models that can add to the learning may be used as root definitions and conceptual models can be too complicated and misunderstood by a team. As Robb (1997) argues, individuals who undertake ISD projects can become trapped in focusing on technical aspects of the ISA and the environment that is constantly changing. Individuals may not have the time to construct formal root definitions and conceptual models (Robb, 1997). From this, it can be argued that any models constructed must meet the systemic perspectives required within SSM. Through examination of the activities that are being designed may not be formal SSM models, but will be designed primarily through dialogue. In Chapter Three of their book, Stowell and West (1994) discuss a number of modelling approaches which they argue can be used as systems tools for client led design. These models include spray and decision tree diagrams, systems maps, control models, causal loop and influence diagrams (similar to the system archetypes Senge, 1990 uses), black box diagrams, structured methods and object-orientated analysis models, as well as rich pictures and conceptual models that SSM already promotes (Stowell and West, 1994).

In a discussion about what each modelling technique incorporates (see Stowell and West, 1994 p61) it is argued firstly that such approaches can be used if they take a systems perspective of the problem situation. Secondly, using what is modelled, the model needs to focus on allowing every individual to have a chance to speak on specific issues, so a stronger language can be developed and incorporated into the models developed. This can represent participants entering the zone of proximal development with each other, allowing learning to take place on specific issues to enable suitable models to be developed. To accompany this point, the issues of entering the zone of proximal development (see Vygotsky, 1978) could be aided if participants have formed a community of practice. This thinking comes from issues associated with the zone of proximal development that can relate to trust, meaning, and practice which represent processes associated with communities of practice (see Wenger, 1998). Checkland and Scholes (1990) express that formal and other systems thinking can be incorporated into stage 4. These techniques could include the

thinking of Beer (1979), as discussed by Checkland (1993), or the system dynamics work of Sterman that Senge (1990) argues for. It is important that participants are happy with whatever process is being used to construct any models. This allows the process of accommodation to be built into the SSM<sup>XL</sup> framework and improves the chances of learning being undertaken as participants' can be free to model 'systems' the most successful way they can. Whatever the outcome of the systems thinking aspect, what has been produced has to be able to be compared at stage 5.

On reaching stage 5, a team will need to compare what was modelled with what was undertaken at stage 2. It is important that the developed language is used, as all individuals need to believe they can discuss issues of the developed models if they think they do not represent the issues drawn out at stage 2. The language developed will also be important in the continuing use of the four disciplines that Senge (1990) argues for. Issues such as individuals' mental models can be tested and altered, if required, so that everyone is discussing and examining the same aspects, as well as being able to create a shared vision and personal mastery on the desired outcome of the project. What is being developed will require all team members to bring the result of the project into existence. Team learning is also important at this stage, which is argued can be undertaken more sufficiently if participants have formed a community of practice on the problem situation. If participants are still finding issues difficult, Bandura's (1986) social learning theory could be used to try and identify if particular issues (e.g., personal, behavioural and cognitive or environmental factors) are a factor. Tools or other techniques could be developed to try and help at this stage.

As has been mentioned, stage 6 relates to undertaking feasible and desirable changes. If the co-operative and client led approaches emphasised have been undertaken, when this stage is reached, the models developed should already have considered desirable and feasible issues, and not propose something that would be in violation. While what has been developed may have been feasibly and culturally justified, the team will justify the intervention planned through the dialogue and languages developed, as well as further develop mental models and a shared vision of this process. If this is achieved, the theoretical assumptions developed can be brought out for all individuals to see.



The final stage of SSM<sup>XL</sup> relates to improving the problem situation. This stage requires the team to take action. As has been discussed through Maturana and Varela (1992), action is to be undertaken through language. Even though models have been developed and the desirability of a change has been discussed, only through language can the action to improve the problem situation be taken, as language is a social process according to Krippendorff (1995a). Nevertheless, the team has to language together to decide if the outcomes of the models require the use of an ISA. If an ISA is argued to be required, the technology has to be brought into the organisation. Second to this point, an ISA will also contain the language developed, as well as continue to use the language throughout the life of the technology. As the work of Ackoff (1967) and Flores et al., (1988) has shown, increasing information quantity may not add value to an organisation. The more ISA available, the more difficult it becomes to decide what actions to take through the quality of the information, and the individuals who placed the information into the ISA (Flores et al., 1988). It is important that when undertaking this stage of the design, through SSM<sup>XL</sup>, that language and dialogue are used to decide what language and dialogue will be used within the ISA. This process should not cause information overload to an individual, and enhance the legitimacy of what is displayed. It is important to remember that the more the language and dialogue moves towards an ISA, the greater the issues for interpretation becomes (Flores et al., 1988). By undertaking this, the chances of the ISA adding to an individual's learning capabilities on behalf of the organisation may improve.

The SSM<sup>XL</sup> framework presented is argued to be more suitable for this piece of research in incorporating a learning approach into soft methodologies for the design and implementation of ISA. A problem that has been highlighted comes from participants' resistance to new technologies. Argyris and Schön (1978) inquire into the resistance to relate to individuals' current theories-in-use, rejecting the technology, even though it may have been designed adequately. Initially, through the participation of the individuals, and the framework and tools of SSM<sup>XL</sup>, these issues may be addressed more effectively. Secondly, a more suitable technology would be designed that could aid the learning capabilities of these individuals, as they helped, through a form of client led design (see Stowell and West, 1994), to carry out the investigation. Barki and Hartwick (1994) call for the study at either the individual or

group level of issues such as conflict resolution to such conflicts and participation. With the use of SSM<sup>XL</sup> and its call for participation, conflicts and other issues may arise that need to be taken into account; which, is argued if undertaken in the right environment and dialogued effectively, can add to the learning achieved.

This whole process of SSM<sup>XL</sup> is argued to create a learning environment for a team. When reaching stage 7 and action is taken, the SSM<sup>XL</sup> framework finishes. The action a team may take next needs to be investigated. A team may use a formal methodology as discussed in Chapter Two, or another process. It is argued that by undertaking the SSM<sup>XL</sup>, whatever new process is used it would not restrict the learning capabilities of the team, but may or may not help develop them further. For example, a more structured ISD methodology may be used to allow an ISA to be brought into the organisation. Whilst such an approach was argued to restrict the learning available, it would not reduce the learning achieved from originally using the SSM<sup>XL</sup> framework. This is considered as action was decided to implement an ISA and use such a methodology. There remains the possibility that an approach could be used to help implement an ISA, as well as build on the learning that has already been established through the SSM<sup>XL</sup> framework.

As has been mentioned in the introduction of this chapter, the SSM<sup>XL</sup> framework was applied in practice within a manufacturing organisation. The organisation has been labelled as BreathCo (not the organisations real name) who wanted to explore the possibility of designing and implementing an ISA to tackle the issue of customer concerns/complaints. The first part of the primary research (Chapter Six) gives a detailed overview of the project undertaken at BreathCo. Following this overview of the customer complaints/concerns project, Chapter Seven focuses on the learning outcomes and analysis from using the SSM<sup>XL</sup> framework in practice. This use and reflection represented the first cycle of the action research strategy that will be detailed in the next chapter (Chapter Five). The second cycle of action research was also conducted at the BreathCo site. This second cycle of action research investigated how the participants of BreathCo, along with the researcher, implemented the ISA to tackle the issue of customer complaints/concerns. This second cycle of action research did not use a formal framework, such as the SSM<sup>XL</sup> framework discussed above. The outcome of this second cycle of action research was a number of learning

points that are argued as needing to be addressed if an ISA is to be implemented and managed with an emphasis on learning the approach can produce. By identifying these learning points through the primary data, collected as part of the BreathCo case, a second framework that can be joined with SSM<sup>XL</sup> to create a learning approach that can be incorporated into a soft methodology for the design and implementation of an ISA can be identified. This second framework came about through going back to the IS literature and investigating how information systems are currently being managed by individuals within organisations. Looking at this literature led the research to the area of technology management and a technology management process framework (TMPF). This literature is laid out in the next section.

It needs to be highlighted that the learning framework came about through theory and practice. The learning framework that is the outcome of this chapter is the main contribution to knowledge that this research has developed. The learning framework that is developed is declared up front in this chapter, in an attempt to make the contribution to knowledge more explicit, while the primary research allows the story of the research to unfold. The learning framework that was developed is then taken to a second organisation (HealthCo (not the organisations real name)) where an attempt is made to apply it in practice (Chapter Nine). As a consequence, the remainder of this chapter deals with how the learning framework was developed in theory.

#### **4.2 The Management of Information Systems**

Looking back, the literature on information Systems (IS), and in particular how ISA can be managed, provides a similar picture to how ISA should be designed. Whilst research is being conducted in this area, the lessons are not being learnt by senior managers and hence individuals are suffering. Management see ISA, and in particular personal computers (PCs), as a tangible tool that are no different to pens, lights or other equipment (Carroll and Perin, 1994). It could be considered that the implementation of ISA is not paid enough attention too. Whilst the more structured methodologies may include issues such as these within them, the criticisms that these approaches attract, which were pointed out in Chapter Two, still remain. More structured methodologies do not take account of the different perspectives that implementation and management of ISA can bring. If a project team want to continue

building on the learning that can be created through SSM<sup>XL</sup>, another way needs to be found.

Just like learning, the measurement of IS is difficult to quantify (Crowston and Malone, 1994; Johannessen Olaisen and Olsen 1999; Lubbe and Remenyi, 1999). Due to the quantitative nature of IS, it becomes an important issue for managers, but the focus is mainly on transaction processes and the number of reports that can be created (Giaglis, Mylonopoulos and Doukidis, 1999; Junnarkar and Brown, 1997). This quantitative need may arise due to the nature of IS being the biggest capital expenditure in a financial year (Loveman, 1994; Maguire, 2002). Giaglis, Mylonopoulos and Doukidis (1999) support this thinking when they argue the appraisal of IS investment has no firm solution yet, even though the causes have been discussed in the literature. A cost benefit analysis will most likely be required to justify the purchase of the ISA (Loveman, 1994; Maguire, 2002). If management take the previous point, it may highlight the basis of why individuals find difficulty in designing and implementing ISA within an organisation. Galliers (1995) agrees, as he highlights that it is well known that an IS strategy relates to the integration of the IS strategy, as well as the implementation of the ISA and the change the technology will bring to the individuals of an organisation. As has been drawn out, these issues are not taken into account within SSM<sup>XL</sup>. It is with this thinking that the remainder of this chapter will explore how this limitation could be addressed.

Reflecting on the interview data collected with the EDP (BreathCo's computer department) manager of BreathCo, he states technologies are integrated into the organisation using the GREAT process. Once the concerns technology was implemented, it seems to have been left to the main users of the ISA to use the technology to get the benefits envisioned. The EDP department's role provides more of a supporting function for the concerns technology. The problem for the project team either singularly, or with help from the EDP department, is how to manage the concerns technology more formally. For this a more practical framework or model may be required to extend SSM<sup>XL</sup>. This framework could be found through the work of Phaal, Farrukh and Probert (2001; 2004a, b, c) on technology management. As Phaal, Farrukh and Probert (2004a p6 emphasis researchers own) argue, "*the management of technology for business benefit requires effective processes and*

*systems to be put in place to ensure that existing and potential technological resources within the organisation are aligned with its needs, now and in the future.”*

To focus on identifying a suitable management of technology framework this literature can now be reviewed.

#### 4.2.1 The Research Area of Technology Management

Phaal, Farrukh, and Probert (2004c p2) describe the field of technology management as *“a multifunctional and multidisciplinary field, requiring inputs from both commercial and technical functions in the firm and a synthesis of academic perspectives, such as engineering, economics, business studies, social science and psychology.”* The same authors continue by adding that as of yet there are not many practical methods for undertaking technology management, with only a few conceptual models supporting technology management (Phaal, Farrukh and Probert, 2004c). To add to this problem, many factors have impacted upon this research, defining what the term technology management means and this has to be explored. Phaal, Farrukh and Probert (2004c p5) use the European Institute of Technology Management in stating a definition as addressing, *“...the effective identification, selection, acquisition, development, exploitation and protection of technologies (product process and infrastructural) needed to maintain a market position and business performance in accordance with the company’s objectives.”* This definition implies technology management takes account of an organisations ISA base. If a lower level participative approach could be used, that would be of value to a project team, needs to be considered.

A paper by Chanaron and Jolly (1999) see definitions and issues of technology management relating to Research and Development (R&D) Management, Management of Technology (MOT) and Technological Management (TM). The final two definitions proposed by Chanaron and Jolly (1999) seem suitable and may deal with issues that a project team need to undertake. Chanaron and Jolly (1999) propose the definitions differ due to the intended stakes, stakeholders, and scope that each definition includes. The National Research Council outlines the management of technology as the crossing of technical competences with managerial competences (Chanaron and Jolly, 1999). Chanaron and Jolly (1999) perceive that the justification for the management of technology, is to connect an organisations technology portfolio

to the objectives and targets of the individuals of an organisation. This research area may incorporate different issues to that of other frameworks, such as the strategic alignment model does (see Henderson and Venkatraman, 1994), but emphasises more practical elements that may be commensurable with this research and the SSM<sup>XL</sup> developed. The problem, as noted through the definition highlighted by Phaál, Farrukh and Probert (2004c), could relate to the area of technology management focusing on more senior management issues which a project team should not have to deal with.

Chanaron and Jolly (1999) go on to take account of the criticism levelled at that particular definition (stated by the National Research Council), along with the problems other definitions have caused. These definitions have led to the use of technology management and the management of technology as being the same thing (Chanaron and Jolly, 1999). With these differing labels, it is important to highlight that the field can be referred to as 'technology management' which contains the technological management (TM) and management of technology (MOT) processes within it. Technology management therefore, refers to the area in a general sense. Chanaron and Jolly (1999) demonstrate what they believe is the distinction between Research and Development, Management of Technology and Technological Management which is displayed in Figure 4.2.

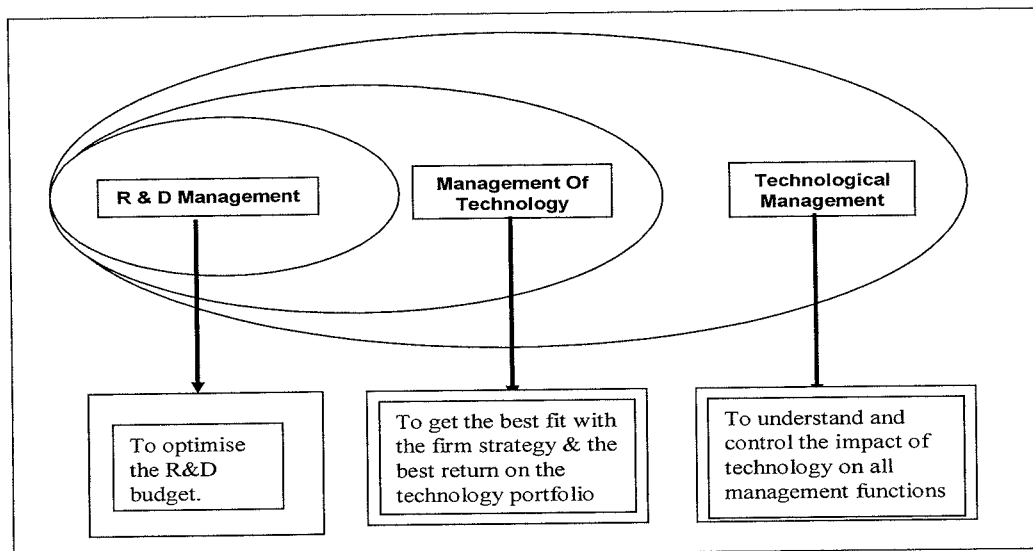


Figure 4.2

*The Relationship between Research and Development Management, Management of Technology, and Technological Management*

Source: Chanaron and Jolly (1999 P615)

Figure 4.2 shows the relationship Chanaron and Jolly (1999) regard between Research and Development Management, Management of Technology and Technological Management. It is relevant to point out that the three areas, whilst being similar, do relate to each other but have important differences (Chanaron and Jolly, 1999). One approach may add more value for this research than the other two. Chanaron and Jolly (1999) state that as the field has developed, it has taken into account more management issues, as well as other topics. For example, Chanaron and Jolly (1999) highlight attitudes towards technology adoption (e.g. Kai-ming Au and Enderwick, 2000); and bridging the gap between technology management and strategic management (Zehner, 2000).

Whilst Figure 4.2 shows the relationship between the three areas and the functions of each, Chanaron and Jolly (1999) believe the differences relate to what they have called the 3 'S' model of stakes, stakeholders and scope. This research identifies the area of management of technology (MOT) as being the most suitable for a group of individuals (e.g., the concerns team) to manage a technology. It is with this issue (MOT) that focus is placed but readers are referred to Chanaron and Jolly's (1999) article for a discussion on research and development (R&D) management and technological management (TM) (see Table 4.1).

The 3 'S' Differentiation	Stakes	Stakeholders	Scope
Management of Technology (MOT)	<p>As several functions within an organisation used technologies (e.g., research and development, manufacturing and information systems), these departments should work together within a more structured approach.</p> <p>From this thinking comes the management of technology.</p>	In comparison to R&D, the management of technology requires decisions to be made by departments that the technology effects (e.g. R&D, manufacturing and information systems).	<p>Whilst the R&amp;D scope takes a view of itself, the management of technology has to accommodate all technologies within an organisation.</p> <p>The management of technology "has to deal with numerous issues such as technology forecasting, scanning, creation and development, acquisition, exploitation, dissemination, commercialisation, transfer, implementation and withdrawal" (Chanaron and Jolly, 1999 p616).</p>

Table 4.1

*The Difference in Stakes, Stakeholders, and Scope for the Management of Technology*  
Adapted From: Chanaron and Jolly (1999 PP. 615 – 616)

Table 4.1 list the stakes, stakeholders, and scope for the management of technology. What needs to be pointed out through Figure 4.2 and Table 4.1 is that issues, in relation to ‘technology’, do not necessarily refer to information systems only. The ‘technologies’ that this area refers to could be any aspect of an organisation’s business that is used for creating, using, or selling a particular implemented technology. Adding to this issue further, Phaal, Farrukh and Probert (2004a) state that whilst technology is usually perceived from a science and engineering perspective, this perspective would usually focus on the ‘hard’ aspects that a technology encompasses. Whilst these hard aspects are important, it is argued that softer issues should be considered in an attempt to understand how the harder aspects can be undertaken. Only by focusing on the ‘soft’ issues, can the ‘hard’ issues be undertaken more effectively, such as how the output of any technology is used to enhance an organisation. By trying to incorporate a softer perspective, the area of management of technology is identified as being the most useful within the field of technology management. The management of technology approach seems more suitably applied to the processes that the BreathCo customer concerns management (CCM) project team have had, and need to deal with. These issues are best encompassed through the quote provided by Chanaron and Jolly (1999) through the scope of the management of technology in creating, acquiring, exploiting and disseminating technologies, as a processes that needs to be followed. As some of these issues have been revealed through the BreathCo case, a framework, or model, that can help the project team undertake these issues now needs to be formally identified. This framework could also make more explicit what was found through the second cycle of action research. This thinking leads into exploring how such a framework could be developed, which builds on the work laid out through the management of technology process.

### **4.3 The Management of Technology Process**

The problem of integrating and managing the customer concerns technology, drawn out from BreathCo, was identified as coming under the area of management of technology. This is stated as the participants that make up the team ‘managing’ aspects of the technology. A model from this area that may add value for the team, and this research, comes from technology road mapping as adopted by Phaal, Farrukh and Probert (2001; 2004a, b, c), and their colleagues at the University of Cambridge.



Technology roadmapping is discussed as a practical model that individuals within an organisation can use (or a project team that has implemented an ISA) to manage their ISA as well as other technologies. Based on the work of Gregory (1995), Phaal, Farrukh and Probert (2001) state that the technology management process framework consists of five processes. These five processes can be seen as a simple model presented in Figure 4.3.

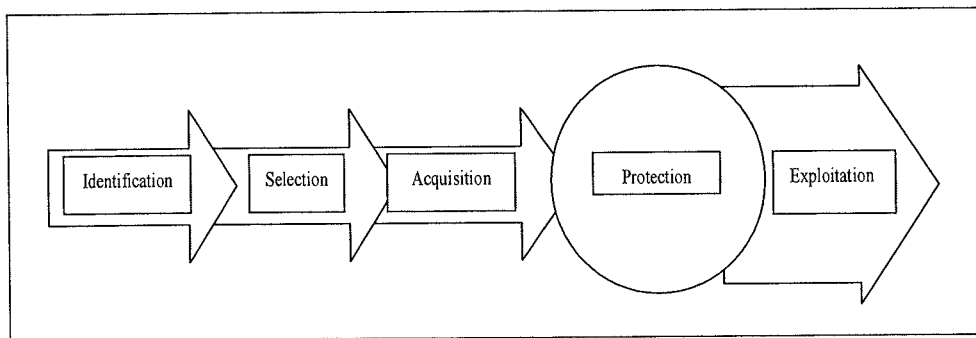


Figure 4.3  
*Technology Management Process Model*  
Source: Venus (1999 P14)

Figure 4.3 shows that the technology management process model consists of the identification, selection, acquisition, protection, and exploitation stages (ISAPE). These stages are listed by Phaal, Farrukh and Probert (2001 p 117), and adapted from Gregory (1995) as:

- *Identification of technologies, which are (or may be) of importance to the business.*
- *Selection of technologies that should be supported by the organisation.*
- *Acquisition and assimilation of selected technologies.*
- *Exploitation of technologies to generate profit, or other benefits.*
- *Protection of knowledge and expertise embedded in products and manufacturing systems.*

Whilst Phaal, Farrukh and Probert (2001) have based their model on the work of Gregory (1995), they admit that other models have been developed for a similar purpose and are closely related. This relation is linked to product development, but as Gregory's (1995) work can be seen as generic, this and other models seem to be

compatible. Whilst the model (Figure 4.3) is shown by Venus (1999) as a linear process, the model developed by Gregory (1995) is circular in nature. Gregory (1995) argues that even though the model may start with the identification stage, the model is circular and as a consequence has many points where a project can start or finish. This is similar to the SSM<sup>XL</sup> framework. This similarity provides the first synergy required if SSM<sup>XL</sup> is able to be built upon by joining it with a second framework. The full model as developed by Gregory (1995) can be seen in Figure 4.4.

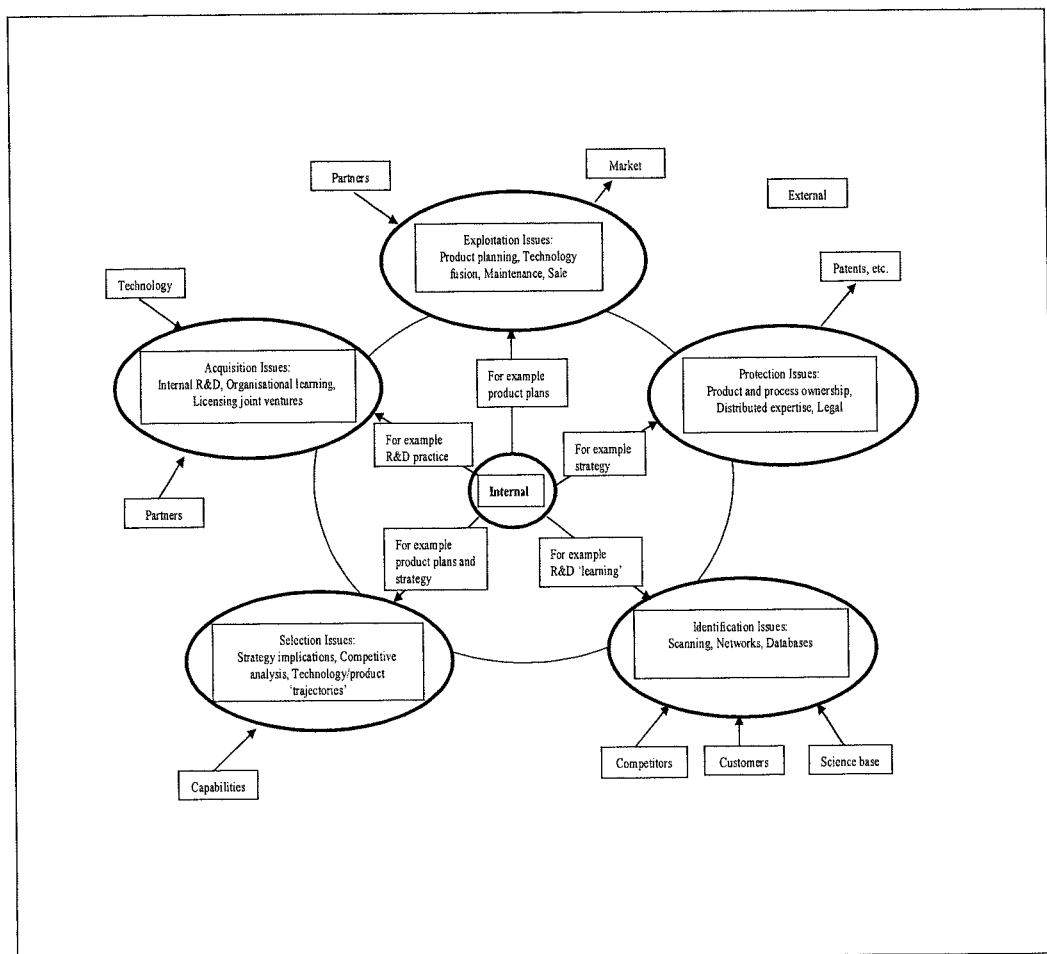


Figure 4.4

*Key Issues within the (Simplified) Technology Management Process Framework*  
Source: Gregory (1995 P350)

Whilst Figure 4.4 displays the model that many academics refine, or develop their own models from, it is worth briefly exploring why the model is argued as applicable for the field of 'technology management'. When Gregory (1995) was developing his model, he highlighted the void that currently existed in relation to models that can be used for the management of technology. With this problem, Gregory (1995) set out to

research the main bodies of work that relate to technology management. These areas include:

- competence and capability, described as “*the ‘knowledge assets of a firm as distinct from the ability to serve customers and respond to competitors;’*”
- R&D management, relating to actual resources and the management of projects;
- innovation which relates to not only an innovation but also regards teams, environmental influences, and the change between these areas and the activities that leads to innovation;
- organizational learning which includes the issues discussed within Chapter Three;
- new product introduction which perceives communication between different functions of an organisation, key organisational activities in introducing new products, and how fast an organisation can respond to new products and customers (Gregory, 1995 p348 – 349).

It is with these areas, and other missing links as identified by Gregory (1995), including technology strategy and its relation to technology management, that his 1995 model was developed (see Figure 4.4).

Whilst Gregory (1995) goes on to describe the processes of ISAEP (listed above), it is important to review the reasons why he argues the model is important. Gregory (1995) firstly acknowledges the model can be used to chart the processes set out in the technology management literature and highlighted above (competences and capabilities, R&D management, innovation, organizational learning and new product introduction). Secondly, Gregory believes the ease of the model, allows individuals’ within organisations to chart the progress of technologies which could appear as an analysis process for individuals on behalf of the organisation. It is this point that is of interest. How the customer concerns management (CCM) project was charted may aid the learning that could be achieved at that stage, as well as make the tacit issues

more explicit, whilst trying to remove the emphasis on solely looking at the ISA in a structured format.

It is from Gregory's (1995) model that Phaal and his colleagues (Phaal, Farrukh and Probert, 2001; 2004a, b, c) developed their technology roadmapping approach. As has been highlighted above, the approach the model was developed for, needs to be stated. This research takes the perspective that the management of technology approach is the most suitable for the BreathCo team, whilst an approach of technological management should be the function for senior management to accomplish. As the models presented by Gregory (1995), and Phaal, Farrukh and Probert (2001) refer to the management of technology; it is firstly argued that the models are commensurable with what has been uncovered within the BreathCo project. Secondly, the model can help a project team consider what is required in managing the concerns technology, now and in the future.

If Gregory's (1995) model was the basis for Phaal, Farrukh and Probert's (2001), it is assumed that they are effectively focusing on a technology management assessment procedure (TMAP). Focusing on the TMAP procedure, a way to integrate as well as communicate an organisations financial, operations, marketing, and human resources strategies with the technology strategy can be implemented. Phaal, Farrukh and Probert (2004a) argue that their approach is a very powerful way for individuals' within organisations to support their technology management and planning processes. This allows for the exploitation and communication of the many links between an organisation's technological resources, its objectives, and the environment that is currently being occupied. Whilst this process is important for senior management, in association with IS professionals, these issues are not the responsibility of the BreathCo CCM project team. Using the model for only undertaking the identification, selection, acquisition, exploitation, and protection aspects of a project is considered. Through the analysis of the data from the BreathCo case, it can be argued that the CCM project went through these processes, and therefore, making the framework more explicit, would have provided a more suitable approach for the project team to have followed. Phaal, Farrukh and Probert (2004b) consider that

using a technology management assessment procedure follows a workshop style bringing together any stakeholders, as well as other experts, which enables knowledge about the issue (e.g., Identification, Selection, Acquisition, Exploitation and Protection) to be identified, discussed, and shared.

Phaal, Farrukh and Probert (2001) base their TMAP process on Gregory's (1995) model (see Figure 4.4). Phaah, Farrukh and Probert (2001) display a simplified version of the ISAEP framework as a jigsaw that is connected together, as shown by Figure 4.5. It should be noted how Figure 4.5 has been displayed in comparison to the linear model depicted by Venus (1999), even though Venus (1999) was part of that Cambridge research group which developed the technology roadmapping approach.

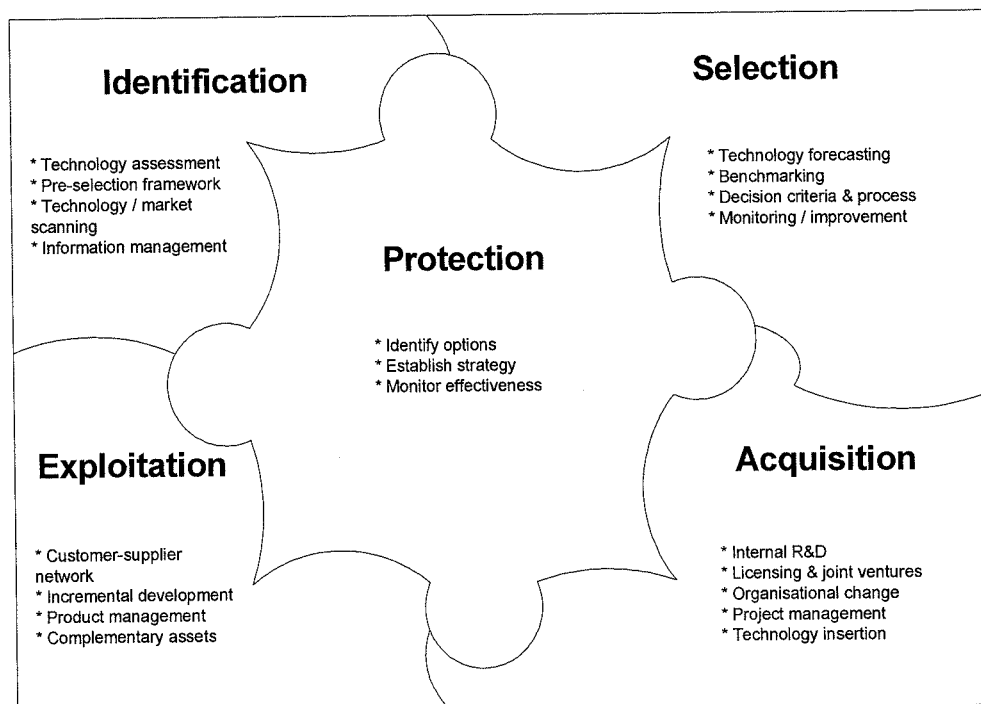


Figure 4.5  
*The Technology Management Process Framework*  
 Source: Phaah, Farrukh and Probert (2001 P1118)

Whilst Figure 4.5 shows Phaah, Farrukh and Probert's (2001) technology management process framework, it should be noted that each section of the model contains the same processes as Gregory's (1995). Gregory (1995) espouses that his model (Figure 4.4) was designed for ease of use, but it is believed that Phaah, Farrukh and Probert's (2001) in terms of simplicity, seems more appropriate, even though they are

essentially the same. Figure 4.5 is also considered to demonstrate the more practical processes that need to be undertaken. The differences seem to lie in the placement of each of the main processes (identification, selection, acquisition, exploitation, and protection) with a greater emphasis on the protection process of a technology. The model presented by Phaal, Farrukh and Probert (2001) is displayed in a logical order with identification being the first phase, exploitation being the last, and a constant emphasis on protection. If the two frameworks (the SSM<sup>XL</sup> framework and the technology management process framework) were joined, the team may be able to move backwards and forwards through both frameworks as and when required. For the actual roadmapping approach developed from the ISAEP approaches, readers are referred to the centre for technology management at the University of Cambridge.

Phaal, Farrukh and Probert (2004c) add that each of the five process of Figure 4.5 would not usually be managed separately as they may be related to other business functions. Whilst this is true from a technological management perspective, the five processes themselves are deemed as appropriate in helping a project team manage this aspect of a project, and are considered separately from other processes of technological management. A number of the processes the technology management process framework considers, are argued as identified within BreathCo. The processes however, need to be addressed formally, to judge the suitability of this second framework.

#### **4.4 Adapting the Technology Management Process Framework**

The previous section has argued for the use of the five processes that make the technology process framework (Identification, Selection Acquisition, Exploitation, and Protection). How this TMPF can be adapted for this research now needs to be discussed. It is proposed that whilst the original processes Phaal, Farrukh and Probert (2001) can still be undertaken, other processes can also be used. For example, to undertake each ISAEP issue, a particular 'road map' can be used. The eight types of roadmap that have been identified so far include: multiple layers, bars, tables, graphs, pictorial representations, flow charts, single layer, and text (Phaal, Farrukh and Probert 2004a). Whilst not going into detail about what each format means, it is important to highlight why many different types exist. Phaal, Farrukh and Probert

(2004a) state the answer to this question as being unknown, as there are no clear rules or guidelines that go into their construction. Phaal, Farrukh and Probert (2004a) continue by adding that the format selected may relate to the current situation being faced in relation to the current business needs, information available, resources, and how best the message can be communicated.

It is argued that within each of the processes of ISAEP, different formats could be used as well as other models. For example, within the BreathCo case, rich pictures, flow charts, and the appreciative inquiry method's (AIM) Venn diagrams were used (discussed in Chapter Six). It is argued that the specific formats (or others) which the BreathCo team have used during the exploration and modelling stages within SSM<sup>XL</sup> could also be incorporated within each ISAEP process if required. Emphasis seems to be placed on the communication aspect of the framework. It is assumed that if the participants are using a specific format, within a specific process, as long as what is happening or seems to be happening can be communicated, the format should be valid for that group of individuals. This would further strengthen the argument for different formats being included in this framework. Zehner (2000) is in agreement, as he argues communication as being an issue, which management of technology programmes create through frameworks and language development. An example of this communication using different roadmaps is shown in Figure 4.6.

Figure 4.6 has been developed to show the different approaches that individuals within an organisation *could* use to communicate management aspects of an ISA. The additions are not designed as the ideal type, but represent processes the CCM team has used throughout the project to communicate aspects within SSM<sup>XL</sup>. These and other approaches could be used within aspects of ISAEP, just as long as what is used allows communication to happen, and hopefully can allow a 'place' where learning can take place. This communication is important, as what is generated through any stage will be built upon in other stages.

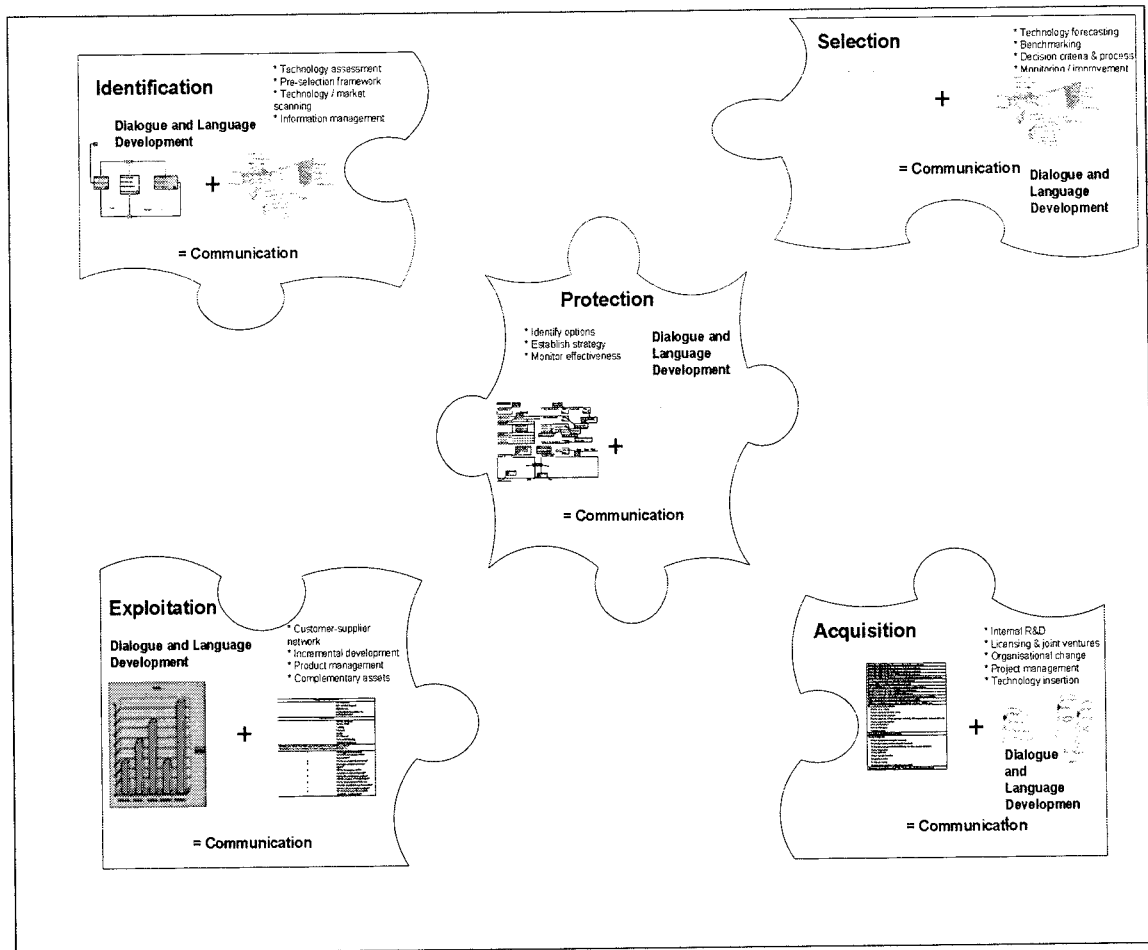


Figure 4.6

*Emphasising the Different Formats that could be used within Each Phase of the Technology Management Process Framework*

Adapted From: Phaál, Farrukh and Probert (2001)

Phaál, Farrukh and Probert (2004c) however, warn that identifying a technology requires filtration techniques so only suitable technologies can be selected. If no filter is used it may add to 'flashes of commercial insight' that Lubbe and Remenyi (1999) identified within IT investment processes for organisations. Lubbe and Remenyi (1999) identified most selection processes involved 'flashes of commercial insight' (e.g., selecting the latest technology because a competitor had done so) that provided little learning from the process, in comparison to what the authors termed a formal strategic information systems planning processes (SISP). This is why it is argued that SSM<sup>XL</sup> is used to plan and implement an ISA, as a client led approach to provide this filter in the types of IS that could be identified when phase 7 is reached. Phase 7 could be identified as the start of a strategic information systems planning process (cf. Lubbe and Remenyi, 1999) which also produces learning opportunities for all participants of a team.



Through their model, and the development of technology roadmapping, Phaál, Farrukh and Probert (2004a, b, c) have gone on to further test their framework and conduct workshops for individuals within organisations in this area. The model adopted for this research considers using only the five processes of identification, selection, acquisition, exploitation, and protection; but the principals are considered to be the same. The model is not a mechanical methodology but a process to aid learning experiences that is flexible and can be adapted to the specific circumstance (Phaal, Farrukh and Probert, 2004a) as well as each process benefiting from the feedback and learning that is achieved (Phaal, Farrukh and Probert, 2004c). For example, a project team may bring a variety of data and information to discuss how identification can be undertaken. This may still not clarify how best a project team can identify the most suitable ISA. Other processes, such as rich pictures, could be developed to explore this area. What is important is that whichever process is used, it can create a dialogue and build on the shared language already created. To accompany this, it is also hoped that the theories of the learning organization can also contribute to participants undertaking single and double-loop learning with all stakeholders; mental models being challenged along with the other learning organization conditions that Senge (1990) argues for. It is due to the emphasis on the learning experiences generated, and the flexibility, as well as being able to start and stop anywhere, that the model is perceived as suitable as the second phase in developing a learning framework for ISA planning, implementation and management.

A further argument for adopting the TMPF approach comes from the philosophy the framework espouses. The complete technology roadmapping process identifies the 'system' that defines the technology management approach, and includes locating the boundaries, which interface with the approach, and the relationships with which general systems thinking is seen to help (Phaal, Farrukh and Probert, 2004c). Whilst aspects of technology management that link technology in general with commercial aspects of a business, soft systems (see Checkland 1993; Checkland and Scholes, 1990) are also relevant (Phaal, Farrukh and Probert, 2004c). It can be argued that the two frameworks (the SSM<sup>XL</sup> framework and the TMPF) are compatible through the use of 'systems thinking' for undertaking the particular processes highlighted. Drawing on the thinking and taking into account the different formats of roadmaps that exist, and the argument that each process of identification, selection, acquisition,

exploitation, and protection could contain a different format, the model adopted for this research could also build in other systems thinking, which may be learning organization conditions similar to how SSM<sup>XL</sup> was developed. Whilst only focusing on using the technology management process framework to join with the SSM<sup>XL</sup> framework for this research, there is no reason to suggest that using other approaches or further development of this approach could not be the purpose of any future research. For now however, the main task is to discuss how this learning framework can be used in practice to enable more effective exploration.

#### **4.5 The Adoption of a Learning Framework to enable more Effective Problem Exploration, Information Systems Planning, Implementation, and Management**

The technology management process framework has identified a number of processes that a project team should undertake in managing their ISA. The problem is that writers in the area of technology management consider the inclusion of ISA as a norm and as a consequence, a technology can easily be 'identified'. This implies a more objective stance to the information systems development (ISD) process. As has been reviewed in Chapter Two, a number of methodologies adopt this assumption. What has been argued throughout this work and discussed in Chapter Four (choice of research approach and methodology), is that a different perspective to the more objective position is adopted and the reason why the principles of SSM is agreed with is described. By taking this more socially constructed assumption and the development of the framework argued for (SSM<sup>XL</sup>), will inevitably be affected by the implementation process and the eventual outcome (cf. Hirschheim and Klein, 1989). This is why it is worth arguing for the joining of SSM<sup>XL</sup> with the TMPF. Undertaking such an approach which appears to mix '*paradigmatic influences*' (cf. Hirschheim and Klein 1989 p1213) could be criticised, but Hirschheim and Klein (1989) disagree. Hirschheim and Klein (1989 p1213) believe mixing paradigms lead "*to interesting and creative solutions...*"

By combining the two frameworks with the underlying philosophy of reality being socially constructed, the learning framework could be argued to sit in the information systems development paradigm of 'social relativism' (Hirschheim and Klein, 1989).

Using the work of Hirschheim and Klein (1989 p1205) a framework based on the assumption of social relativism,

*“...favours an approach to systems development that facilitates the learning of all who are concerned and affected. This implies a switch in the role of developer from one of system expert to facilitator who helps to stimulate reflection, co-operation, and experiential learning. In practice, the social relativist approach seeks to provide specific tools that facilitator at his or her discretion may use to support the project group interaction.”*

Based on this social relativist assumption, the adopted learning framework will now be discussed to enable more effective problem exploration, ISA planning, implementation and management.

Firstly, the SSM<sup>XL</sup> framework is used to bring out the emphasis on participation and client led design (cf. Stowell and West, 1994) which is a more suitable strategy for ISD, in comparison to the more structured methodologies. Secondly, SSM<sup>XL</sup> undertakes problem exploration which does not necessarily require the implementation of an IS at this point. The main problem encountered with SSM was the heavy reliance on a researcher or other practitioner, to undertake a majority of the work for individuals interested in using the approach, even though they are encouraged to undertake these aspects themselves. This could be considered as Hirschheim and Klein (1989) state, as the researcher or consultant being the ‘facilitator’. It was argued that the SSM approach, as developed by Checkland and Scholes (1990), could be expanded to take into account the issues and questions that this research seeks. The remainder of the literature review tried to expand Checkland and Scholes’ (1990) original framework using thinking from the learning organization. Emphasis was placed on drawing out tacit issues and converting these into explicit issues for the purpose of discussion, in an attempt to create a learning framework. How the SSM<sup>XL</sup> framework was used and in what environment and by whom is important, as well how the design of an IS is undertaken.

Three learning theories were argued to add value in identifying and exploring how to perceive SSM<sup>XL</sup> and the learning that could be argued to have taken place. The

SSM<sup>XL</sup> framework was proposed to be used by individuals to undertake general organisational problems (as Checkland and Scholes' (1990) original methodology does), but at the same time provides an approach for a project team to design IS, with an emphasis on the learning the approach can bring. Once phase 7 was reached, it was left up to individuals to take the action that they deem is appropriate. By following on from charting how SSM<sup>XL</sup> performed through the practical work undertaken at BreathCo, an ISA was implemented. This ISA was the CCM project and how this was implemented and managed has been argued as important. This analysis led to the argument that SSM<sup>XL</sup> could be joined with the TMPF, as both are considered to compliment each other. Through reviewing the technology management literature, the TMPF was deemed to be expandable. This expansion takes into account the tacit issues that individuals may hold, on how to undertake each ISAEP phase, and try and make these thoughts explicit through applying similar techniques used in expanding SSM<sup>XL</sup>. The two frameworks therefore have to be joined from phase 7 of SSM<sup>XL</sup> to the first phase of the technology process management framework (which can now be labelled as phase 8). On reaching phase 7, individuals have to decide to take action to improve the problem situation using the language that has been developed throughout the previous phase, and the models created.

If an ISA is required, it needs to be brought into an organisation which the original SSM framework does not consider. The added technology management process framework is argued to solve this problem by firstly identifying all suitable IS before looking at how any data should be structured. In order to bring a technology into an organisation a number of other processes need to be undertaken, namely identifying a number of suitable ISA. Secondly, a project team needs to select the most suitable ISA based on the work undertaken through phases 1 to 7, before acquiring the technology. Once an ISA is acquired, the project team has to start exploiting the technology for the given purpose. A project team also need to continually protect and evaluate the IS to make sure that it is giving individuals, or the overall organisation, the benefits it was identified to achieve. A discussion on what this learning framework looks like can now be discussed.

The framework that is presented in Figure 4.7 has been designed to facilitate learning processes whether the resulting outcomes are:

- to improve the problem situation which relates to further enhancing learning activities,
- information system applications or
- information system applications for the purpose of learning.

The process may involve an ISA, or other processes, which then has to be ‘identified’ and can then be considered as moving into this second technology management process framework. The two frameworks together are argued as how a framework can encompass the design, implementation, and management of ISA with an emphasis on learning. This framework uses Soft Systems Methodology expanded for learning and technology management processes. This framework is therefore labelled as SSM<sup>XLTM</sup> (Soft Systems Methodology eXpanded for Learning incorporating Technology Management). The SSM<sup>XLTM</sup> framework is shown as Figure 4.7.

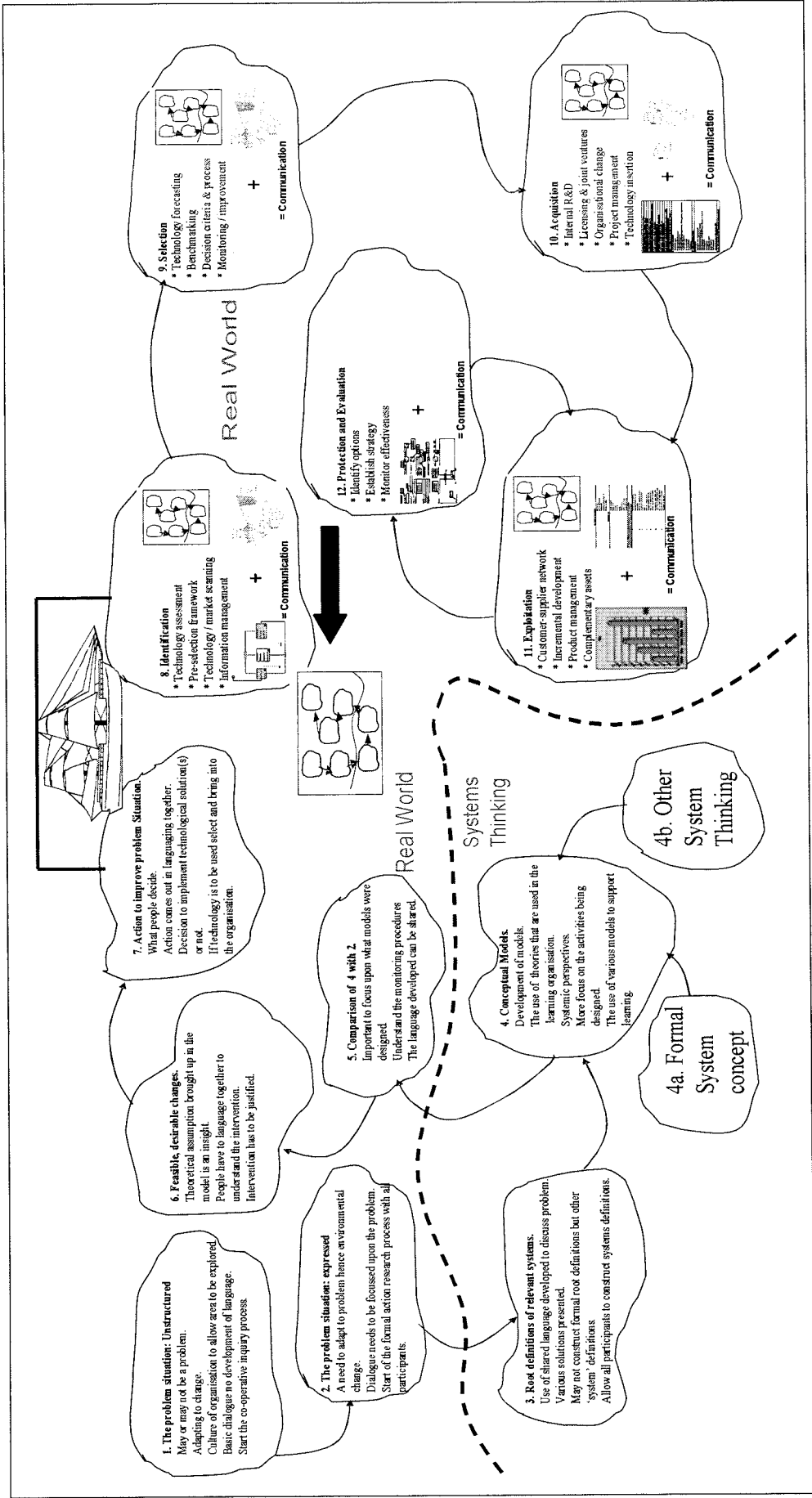


Figure 4.7

*A Soft Systems Methodology Expanded for Learning and Incorporating Technology Management Framework to Support the Learning Activities for Designing, Implementing, and Managing Information System Applications*

Figure 4.7 displays SSM<sup>XLTM</sup> that is posited to help individuals and teams within organisations design, implement, and manage ISA with an emphasis on learning. The outcome of SSM<sup>XLTM</sup> can be an implemented ISA that has drawn on the learning activities of individuals throughout the framework. The remainder of this chapter serves two purposes. Firstly, it is important to discuss the key issues of using such a learning framework (SSM<sup>XLTM</sup>) and the advantages that the approach is envisioned to bring. Other points that also need to be discussed include the contribution of SSM<sup>XLTM</sup>, what the framework is about, and why it is different to other approaches. The second purpose is to discuss the later phases of SSM<sup>XLTM</sup> (phases 8 – 12) and how they could be applied in practice. The first phases of SSM<sup>XLTM</sup> (phases 1 – 7) have been discussed before within the literature review and in the practical work (the BreathCo case) and therefore will not be repeated here. A discussion of the later phases of SSM<sup>XLTM</sup> begins with a review on how the gap between SSM<sup>XL</sup> and the Technology Process Framework (TMPF) adopted can be navigated. Before returning to the first issue that this section addresses, two points are made:

- The SSM<sup>XLTM</sup> framework incorporates a number of phases. Phases are discussed as opposed to stages so not to imply that participants complete a number of objectives before moving on to the next stage. It is the participant's decision as a 'community' to undertake the processes they are comfortable with to draw out the key issues of SSM<sup>XLTM</sup>. It is up to a project team to decide when to move onto the next phase.
- Whilst the later phases of SSM<sup>XLTM</sup> (discussed below) are divided up, this is for the purpose of discussion only. This separation does not imply that the phases are undertaken in this way, as it could imply the principles of reductionism. The advantage of SSM<sup>XLTM</sup> is the complete framework as providing a learning 'system' for ISA design, implementation, use and management.

The SSM<sup>XLTM</sup> framework (Figure 4.7) has been designed so that it can be used by a researcher or consultant, in conjunction with a team (such as the BreathCo case) in either a 'mode 1' (a process to follow) or 'mode 2' (a way to think about problem and

ISA design and implementation situations) perspective. The SSM<sup>XLTM</sup> framework can be followed in sequence or teams can break out to explore different phases if it is believed to help explore or undertake ISA design, implementation, or management. This is just one of the advantages of SSM<sup>XLTM</sup>.

Figure 4.7 is a learning framework (SSM<sup>XLTM</sup>) that has joined SSM<sup>XL</sup>, developed through the literature and has been applied in practice, with the technology management process framework (TMPF) that was identified through the outcomes of the BreathCo case. Whilst the later phases of SSM<sup>XLTM</sup> (phases 8 – 12) are argued to be where ‘action’ is taken to implement and manage an ISA. These phases could be criticised for focusing too much on the more structured aspects of technology implementation and management. The problem is that at times within organisational life it is inevitable that something has to be done. In order to address the criticism of focusing too much on the structured aspects of ISD, Figure 4.7 displays phases 8 – 12 containing smaller SSM<sup>XL</sup> frameworks within each of the corners, in an attempt to soften up this more structured approach. If participants are finding particular aspects of SSM<sup>XLTM</sup> problematical, SSM<sup>XL</sup> could be one approach adopted to explore these issues to help participants focus on what ‘action’ needs to be taken. When participants believe an ISA cannot be exploited and protected further, a problem is noted to occur where the full SSM<sup>XLTM</sup> framework may need to be re-worked through again resulting in a newer ISA being designed, implemented and managed. The SSM<sup>XLTM</sup> framework is therefore recursive in nature, which is one of its advantages. Whilst SSM<sup>XL</sup> appears in the corners of phases 8 – 12, there is no reason why participants can not use SSM<sup>XL</sup> to help in the earlier phases of the learning framework if particular phases are envisioned to be problematical.

The main purpose and difference of SSM<sup>XLTM</sup> is to help individuals come together to form a community of practice to design and implement ISA with an emphasis on learning. The contribution that this SSM<sup>XLTM</sup> framework aims to undertake is to bring all relevant stakeholders of any ISD project together. Along with this point SSM<sup>XLTM</sup> allows a more suitable exploration of problem situations, drawing on a more constructive philosophy as opposed to the more objective approach that traditional ISD methodologies promote. From this exploration phase, SSM<sup>XLTM</sup> has gone further by incorporating thinking from the area of management of technology (MOT) within



the field of technology management. Traditional MOT approaches have problems; most notably, with reference to this work, a lack of incorporating a learning approach within them. By joining the SSM<sup>XL</sup> framework with the TMPF, an approach to explore problems as well as undertake the design, implementation, and management of an ISA has been developed. The later phases of the SSM<sup>XLTM</sup> framework (8 – 12) therefore, have also been designed to promote learning capabilities within each of the phases. This is envisioned to be undertaken through the learning organization conditions of dialogue development, promoting a shared language, Senge's (1990) disciplines and any tools and techniques that support such approaches, as well as allowing SSM<sup>XL</sup> to be used if required. By designing these phases in such a way, it allows a link to be maintained between implementation and management with the learning the earlier phases promotes.

The later phases of SSM<sup>XLTM</sup> requires action to be taken but due to how these phases have been developed, reflection is promoted which ties SSM<sup>XLTM</sup> together and promotes a more constructive outlook to emerge. It can be summarised that the SSM<sup>XLTM</sup> framework is holistic in two ways:

- By looking at the full picture of ISD projects including design, implementation and management
- Trying to co-opt all relevant stakeholders in the full framework

The final point is very important, as it is associated with one of the most important issues of SSM<sup>XLTM</sup> and that relates to the learning activities that are being promoted.

Learning activities are being undertaken by individuals within organisations even if they are not formally recorded. It has been noted that the learning theory of communities of practice (COPs) has been paid attention to within the IS literature, as well as the field of the learning organization. The problem is that a community of practise (COP) cannot be managed or controlled. It is proposed therefore that SSM<sup>XLTM</sup> is a process that can aid a COP to form. With an emphasis on problem exploration and action to be taken, relevant stakeholders can come together and the seeds of a community could be planted with participants entering, moving around, and

leaving the community as phases of the framework are undertaken. Whilst COPs is a useful learning theory, a further two learning theories were investigated as useful. These two theories are Bandura's (1986) social learning theory, and in particular his model of triadic reciprocity, and Vygotsky's (1978) zone of proximal development (ZPD). Whilst no attempt has been made to incorporate these theories within the phases of SSM<sup>XLTM</sup>, they are argued to be valuable in the use of the SSM<sup>XLTM</sup> framework.

Where participants come together to explore any unstructured problems and in turn structure problems, where these activities take place (the environment), and which individuals are involved (behavioural and cognitive factors as well as personal factors) can either help or hinder. Focusing on issues such as environmental, personal, and behavioural and cognitive factors could allow conditions that are more favourable where learning activities can take place. Where individuals join the community can represent different areas of an organisation and these individuals can help other individuals learn through the ZPD about processes and issues that the exploration phase needs to dialogue and consider. This argument can also be used on how modelling is undertaken and comparisons made to phase 2. Once this is achieved, feasible and desirable changes could be undertaken more appropriately and dialogued more effectively before deciding to take appropriate action that may involve the implementation of an ISA.

Whilst in the later phases of SSM<sup>XLTM</sup>, the theories of learning are not lost as more practical work is undertaken in the 'real world'. How best to identify, select, acquire, exploit and protect, and evaluate an ISA could be associated with who is involved in these processes and how best it is envisioned that these processes should be undertaken. More capable individuals (e.g., IS developers) may help other participants learn within the community through the ZPD on IS development issues. At the same time, participants can help other participants learn through the ZPD the appropriate issues that cannot be neglected if the ISA is to be a success within a particular organisation. These issues build on the earlier phases and previous learning generated within SSM<sup>XLTM</sup>.

In summary, where a community of practice (COP) is where SSM<sup>XLTM</sup> can be worked through, the phases of the framework could be best explored through Bandura (1986) and Vygotsky's (1978) learning theories. It is argued that by exploring SSM<sup>XLTM</sup> through the three theories of learning stated, the framework can be used more successfully, as well as helping all participants' design, implement, and manage an ISA more productively with an emphasis that the approach promotes.

It is hoped that SSM<sup>XLTM</sup> can be applied by teams acting on their own behalf within a community of practice with less reliance on a researcher or consultant, even though these individuals may become co-opted within the community of practice. Whilst the above discussion has concentrated on the advantages and contribution of SSM<sup>XLTM</sup>, the remaining three sections focus more on the later phases of SSM<sup>XLTM</sup>. These sections have been developed from the technology management process framework, but need to be reviewed to look at how they can be used in practice.

#### 4.5.1 Navigating the Gap between Taking Action to Improve the Problem Situation and Identifying Suitable Information Systems

The seventh phase of SSM<sup>XLTM</sup> aims to:

- take action to improve the problem situation from what the participants decide
- action could involve the implementation of an IS but is not a necessity; but if an ISA is required it needs to be brought into an organisation
- in order to do this a suitable ISA needs to be identified.

This is depicted in Figure 4.8.

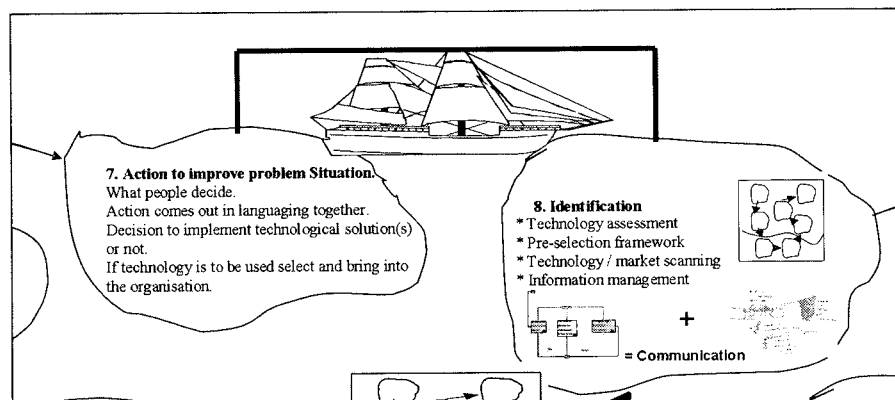


Figure 4.8

*Moving From the Softer Perspectives to the More Structured Aspects of the SSM<sup>XLTM</sup> Framework*

In reaching phase 7 of SSM<sup>XLTM</sup>, actions to improve the problem situation are considered very similar in nature to the identification phase of the technology management process framework. A boat is displayed linking the two within this SSM<sup>XLTM</sup> framework. It is considered that through the work that has been undertaken in the earlier phases, and through the learning that has been undertaken on exploring the problem, participants can travel to phase 8 of SSM<sup>XLTM</sup>, and start to implement the most suitable ISA. A criticism could emerge through the change of philosophy, from the softer approaches to harder structured approaches that an ISA project requires. Whilst this debate continues, work has been carried out to take account of this change (e.g., Champion and Stowell, 2000; Champion, Stowell and O'Callaghan, 2005; Guo, Wu and Stowell, 2000; Stowell, 2000). How a project team moves from the softer exploration aspect (phases 1-7) to the more structured doing aspects (phases 8-12) of the SSM<sup>XLTM</sup> framework is important.

Champion and Stowell (2000) point out that Stowell was the first to suggest that SSM can be linked to more structured IS approaches without losing the subjective perspectives the softer approaches promote. It is believed that this argument can also be held with the first seven phases of SSM<sup>XLTM</sup>, as the approach draws heavily on the work of SSM. The problem can be stated as one of “...*moving from the clients' developed holistic understanding of the proposed intervention to the technical specification*” (Champion and Stowell, 2000 p277). This work follows in this tradition and can use the lessons learnt. On discussing what Champion and Stowell (2000) refer to as interpretivist information systems design, these authors state that any models developed intended to help implement an ISA have to be clear, as well as be understood by all participants involved (i.e., IS specialists as well as individuals that make up a department). It is this process of inquiry and systems modelling that make up what is described as a ‘*unifying layer*’, or a bridge to focusing upon the more structured methods (Champion and Stowell, 2000 p279). It is proposed that the earlier phases of the SSM<sup>XLTM</sup> framework developed for this research achieve the same purpose. This is considered as the models developed at phase 4 within the BreathCo case were used as the basis of a dialogue with the IS specialist from Info-Tec about ISA development.

Undertaking the early phases of SSM<sup>XLTM</sup> and reaching phase 7, a project team have used softer approaches through constructing models and making comparisons that could be used to identify an ISA. These models could be considered to meet the requirements Champion and Stowell (2000) argue can be used to help implement an ISA in conjunction with all stakeholders. It is believed undertaking the first seven phases of SSM<sup>XLTM</sup> has allowed a filter to be developed in identifying appropriate solutions that will tackle the problem situation, or help identify a suitable ISA. As well as providing this filter, the first seven phases of SSM<sup>XLTM</sup> have allowed the problem situation that was previously unstructured to become structured. Structuring the problem, undertaking modelling processes, and creating a shared language of the problem, has removed the emphasis that an ISA can easily be identified, which the TMPF, or phase 8 would imply, if it was the starting point in any project. The first seven phases of SSM<sup>XLTM</sup> achieves the advantages that SSM sets out to do, and what the hard, more structured methodologies were criticised for not achieving. The problem or limitation that Guo, Wu and Stowell (2000) consider is converting the outcome of an SSM investigation to an IS specification, as this may lead to a loss of richness of the SSM approach. As this issue cannot be ignored, it is proposed that the learning activities that it is hoped will be generated will go some way to limiting this issue. This will now be explored.

The approaches identified in this research, with the emphasis on learning and the tools used, and the models developed, can all be used as a basis to try to identify a suitable ISA, which begins at phase 8. For example, for the CCM project, the documents developed could be seen as undertaking the filtration process that allow more suitable ISA to be identified. Within the BreathCo case, the filters can be considered to represent the technology wish list specification and the customer concerns management specification, as well as the modelling that was undertaken during what is labelled as relevant systems and conceptual models. As the participants of BreathCo used what they were confident in using to model relevant systems, the process has attempted to remove what Stowell (2000) states as difficulties in converting user requirements to technical issues. The work undertaken, to help move into the identification phase of SSM<sup>XLTM</sup> can then be carried forward to the next phase to incorporate what Phaál, Farrukh and Probert (2004c) describe as incorporating 'downstream' flows. This can be described as what was undertaken at the

identification phase being carried forward to help with selection and acquisition issues (Phaal, Farrukh and Probert, 2004c). This thinking can apply to SSM<sup>XLTM</sup>, whether a team is working in the earlier phases, or the later, more IS focused phases. Being able to navigate from the softer perspectives of SSM<sup>XLTM</sup> allows the participants then to start identifying, selecting, and acquiring the most suitable ISA. These issues are undertaken within the identification, selection, and acquisition phases of the framework. If however, these identification, selection and acquisition processes are causing a project team problems, a learning approach can be adopted in the form of an SSM<sup>XL</sup> framework. This is shown within each of the corners of phases 8 – 11 of Figure 4.7 and can be used more or less extensively depending on the complexity of the problem. The learning approach therefore, is recursively embedded within each level of the inquiry. These identification, selection, and acquisition processes will be further explored.

#### **4.5.2 Identification, Selection, and Acquisition of an Information System**

The eighth phase of SSM<sup>XLTM</sup> aims to:

- identify suitable ISA through accessing information both internally and externally
- considering technology vendors, specialists or off the shelf solutions
- communicate this information to all stakeholders

The ninth phase of SSM<sup>XLTM</sup> aims to:

- develop procedures to help make decisions on the most suitable identified ISA
- the decision procedures need to be made explicit and include all stakeholders
- comparisons could be made with competitors or individuals within other organisations that are implementing similar ISA

The tenth phase of SSM<sup>XLTM</sup> aims to:

- acquire a selected ISA by means of implementing the ISA from within an organisation (e.g., by an organisations dedicated computer department)
- either buying an ISA from ‘off the shelf’
- or contracting the work out to a specialist information system developer

Figure 4.9 highlights these issues below. It should be noted that Figure 4.7 and Figure 4.9 show the processes that Phaah, Farrukh and Probert (2001) use. Whilst these processes may be considered formal technological road mapping approaches, some of these processes can be undertaken as part of SSM<sup>XLTM</sup> as has been discussed within the section on incorporating the TMPF. What is important is that each phase allows a project team to discuss the process under consideration explicitly. If this is not possible, a problem may have presented itself. In order to address this SSM<sup>XL</sup> could be used depending on the extensiveness of the problem.

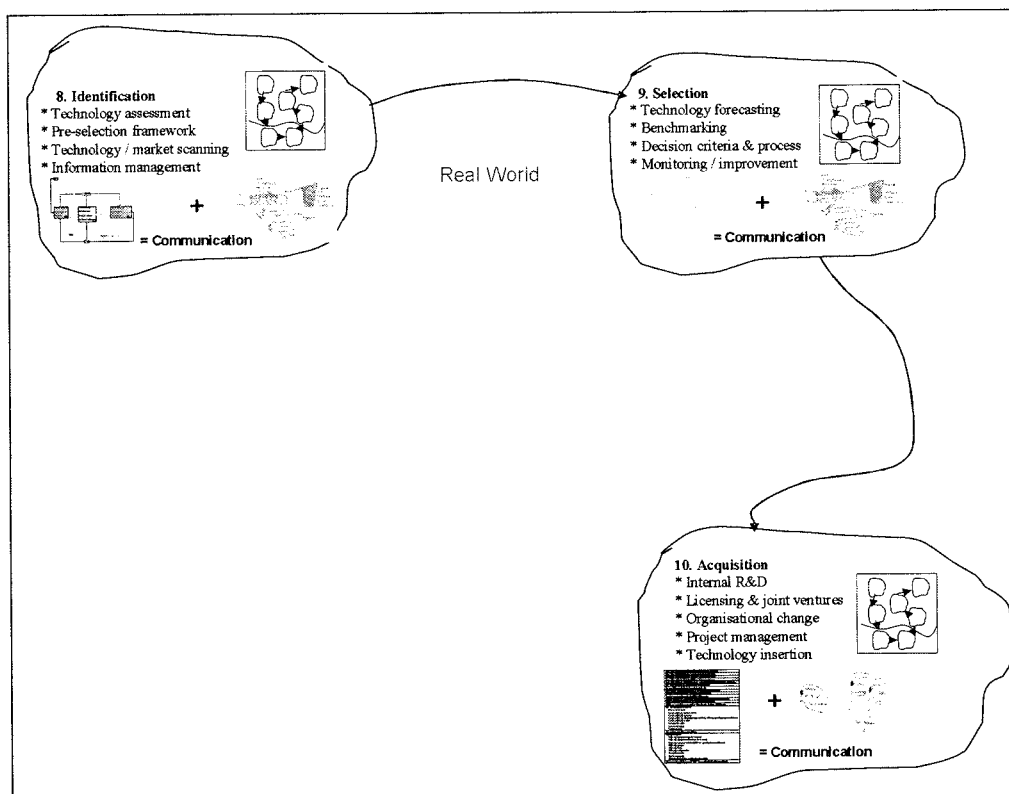


Figure 4.9

*Identifying, Selecting and Acquiring a Suitable Information System Application*

On entering this part of the SSM<sup>XLTM</sup> framework (phase 8), as shown by Figure 4.7 and Figure 4.9, a logical order is presented from identification to selection to acquisition. Even though this order is presented as logical, it does not imply it should be followed sequentially. As has been mentioned earlier, a team could start at any phase and work backwards or forwards, with phases being re-worked if required. For example, if a team reaches the acquisition phase, and are finding the best process for acquiring the selected technology troublesome, a step back to review the ISA selected may open a debate on the reasons the technology was selected. This debate could

produce strategies for how best to acquire the ISA, e.g., prototyping. Perhaps it would draw out the issue of requiring the identification of a more suitable ISA that would be easier to acquire for individuals within an organisation (and still meet the requirements modelled), as these issues were not addressed previously during identification and selection phases.

Venus (1999) believes IS identification is undertaken in a more unstructured ad-hoc basis. The purpose of the identification phase is to correct this problem and bring together a variety of data, as well as the appropriate stakeholders. The data can then be discussed. As a variety of processes could be used to collect the data and discuss it, participants are open to use any tools and techniques deemed helpful. Figure 4.9 displays rich pictures and flow models as examples. The purpose of this phase and the others, is to challenge participant's mental models on should an ISA be identified and if so how, as well as further develop personal mastery, creating a shared vision, and undertake team learning (cf. Senge, 1990). Once all appropriate ISA have been identified, the most suitable needs to be selected.

Selecting an ISA requires decisions to be made by all participants of a team. In order to do this, all the implications an ISA will bring have to be drawn out. Decision criteria processes can be used to help with this phase, along with the advantages and limitations of selecting a particular ISA. This is why an attempt is made to enhance the learning organization conditions. For example, being able to undertake double-loop learning (cf. Argyris and Schön, 1978, 1996) can make issues that participants camouflage and try and hide, explicit. By making these issues explicit, the team hopefully can dialogue the problem more effectively, so that the most suitable ISA will be selected.

Once the most suitable ISA has been selected, there are various channels that a team can use to acquire the technology. These have been placed into bullet points above and can be seen in Figure 4.9. Whichever way a team chooses to proceed, the ISA needs to be formally managed so time and budget issues are upheld (Venus, 1999). This phase can be difficult, so a team needs to know support is available especially when inserting the technology alongside an organisation's other ISA. Individuals within an organisations computer department (if applicable and available) should be



involved in this phase. It is at this phase that a project team also has to consider training issues and how these can be constructed and undertaken. It is important that the 'human' element of IS implementation is not neglected.

As has been displayed and discussed previously, the aim of each phase is communicating the key issues. Processes that teams find useful (e.g., brainstorming, flow charts, rich pictures) can be used to further develop the language of the community, or help new members (e.g. IS developers and other technology specialists) if they become involved in this aspect of the SSM<sup>XLTM</sup> framework. The processes displayed within the framework, as well as the techniques discussed, are not the only processes that can be used but were undertaken and found useful within BreathCo. A team could use the work books and other techniques Phaah, Farrukh and Probert (2004a, b) have developed if they are deemed useful. An aim is for an ISA to be identified, selected, and acquired through the techniques the community consider appropriate, so the exploitation phase can be reached. For example, processes included within a hard methodology such as SSADM or the later stages of Multiview may be adopted if they are believed to add value to a particular phase, as long as it allows tacit issues to be made explicit for discussion within a dialogue and developed through a shared language.

#### **4.5.3 Exploiting and Protecting and Evaluating an Information System**

The eleventh phase of SSM<sup>XLTM</sup> aims to:

- help participants exploit the acquired technology by making sure the ISA is performing to the desired standard
- constructing short, medium, and long term plans to check the ISA suitability
- performing required updates
- maintain communication channels with stakeholders so issues can be resolved quickly

The twelve phase of SSM<sup>XLTM</sup> aims to:

- protect and evaluate an ISA through identifying if the ISA can be exploited further
- consider the requirement of replacing the current ISA

- locate appropriate resources (e.g., internal expertise, support contracts, regular maintenance) to keep the ISA running
- backing up an ISA data requirement's (e.g., customer details, sales)

These issues are displayed through Figure 4.10.

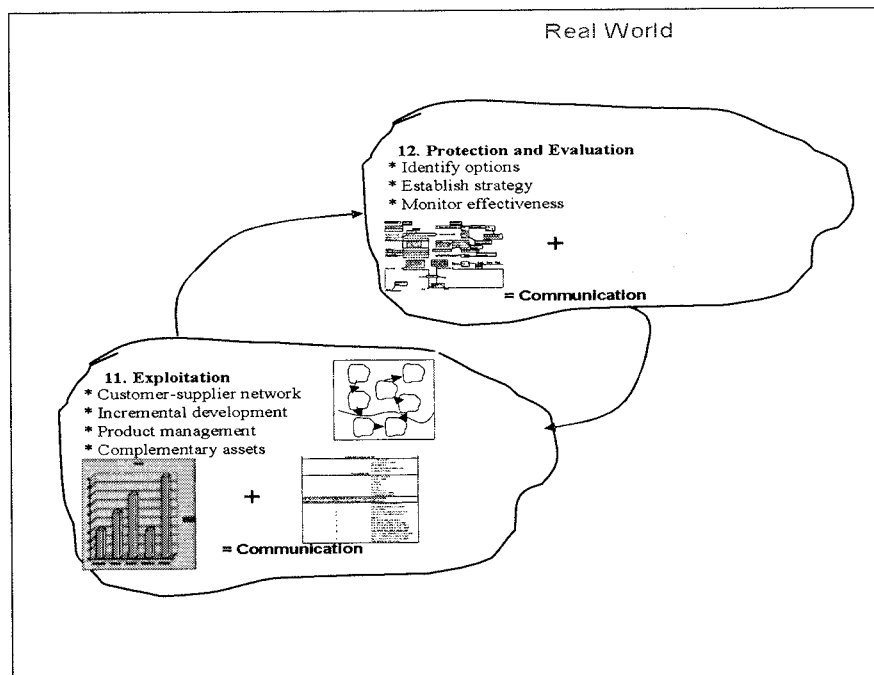


Figure 4.10

*The Final Two Phases of the Soft Systems Methodology Expanded for Learning and Incorporating Technology Management Framework that Exploits and Protects an Information System Application*

Exploiting an ISA is seen as the best way that participants of an organisation can gain advantages (Venus, 1999). Exploiting an ISA requires a project to not only use the ISA to receive the benefits envisioned, but it can also relate to highlighting other problems individuals within an organisation may be encountering that are not yet formally realised. For example, within BreathCo, the concerns technology could not only allow individuals to manage and solve customers concerns more effectively, but by analysing concerns, other problems could be identified and corrected. This can only be achieved if the ISA is functioning correctly. This is why the exploitation and protection phases are shown in Figure 4.10 as being related. Exploitation can also be related to further training issues. If participants are fully trained, they could be able to exploit the ISA further.

To help a project team exploit an ISA more effectively, the ISA needs to be protected. Protection issues can relate to minimising the chances of data being deleted or eroded, or competitors obtaining the data (Venus, 1999). To accompany issues such as data loss, strategies need to be available to keep the ISA running and undertake updates when required. This was seen with the EDP department within the BreathCo case. Whilst it is easy to draw up a list of things to do, participants have to put these into practice. Again, it is argued that communication is required with all stakeholders. Familiar processes could be used by team members (e.g., the AIM Venn diagrams) to focus on what needs to be undertaken.

What is important to comment on by reaching the final phases of SSM<sup>XLTM</sup> is that firstly, the ISA should be exploited to achieve the benefits envisioned. Secondly, once a project is exploiting and protecting the ISA, these phases may constantly be revisited and updated as the IS life cycle moves forward. Finally, once an ISA can no longer be exploited and protected any further, the identification phases may be undertaken again if the ISA is believed to require updating through a form of evaluation. As this research has tried to point out, these issues can be very ambiguous and mainly tacit. If this situation is encountered, the whole process can begin again to see if action can be taken to improve the problem situation, as demonstrated through the arrow leading out of phase 12 of Figure 4.7 and back into phase 1 SSM<sup>XLTM</sup>.

It is argued that the model is recursive in the fact that within the latter phases of SSM<sup>XLTM</sup> (8 – 12), for example; if communicating or undertaking an issue with identification or selection becomes problematical, the exploration phases (1 – 7) could be used to help find the most suitable action to take. That is why each phase shows a smaller SSM<sup>XL</sup> framework in each corner as an approach that a potential team could also use to take action. For example, SSM<sup>XL</sup> could be used to help acquire an ISA that has been selected. This is the main argument for using this SSM<sup>XLTM</sup> framework, as it comes from the communication that is supposed to take place. Creating further dialogue and a shared language within a community of practice can help undertake effective communication on the key issues of each phase. Undertaking this will also allow an ISA to reach the potential for which it was designed and implemented, as well as removing what Argyris (1999) states as problems with IS occurring through design.

**4.6 Summary**

Soft Systems Methodology expanded for Learning (SSM<sup>XL</sup>) has identified theories of the learning organization and organizational learning as useful, and will attempt to activate the use of Senge's (1990) four disciplines as well as the fifth – systems thinking – which SSM utilises, as well as Argyris and Schön's (1978, 1996) single and double-loop learning. While Checkland and Scholes' (1990) SSM is not meant to be used as a technique, it is argued that using the theories of the learning organization and organizational learning is difficult without the help of facilitators or other researchers. It is argued that using the framework of SSM as a way to enact these theories will bring about the benefits of the learning organization, and organizational learning, as well as helping individuals to use SSM, as a greater emphasis is placed on participation within a group of individuals. In order to undertake organizational learning, and build a learning organization, it was argued that the development of language and dialogue is required. Through language and dialogue, it was stated that action can be taken by individuals, which includes using SSM<sup>XL</sup>. Through individuals taking action together, learning can be generated which will benefit the design and implementation of an ISA, as well as the individuals themselves. From the literature reviewed, SSM was then expanded (SSM<sup>XL</sup>).

Through undertaking a rigorous analysis of how SSM<sup>XL</sup> performed in practice (the primary research within BreathCo), the analysis that will be presented drew on a set of key issues including approaches to IS implementation, training, further implementation, maintenance and use issues associated with ISA, and management issues. In an attempt to help a project team maintain a focus on IS implementation and management, the area of technology management was explored. The aim of the literature reviewed was to try and search for a second framework that can help with the implementation and management of an ISD project. At the same time, this second framework needed to further enhance the learning capabilities of the participants that made up the project team. This second framework also needed to commensurate with SSM<sup>XL</sup>.

The technology management literature found defining technology management as problematical, but a focus on stakes, stakeholders, and scope helped define three approaches to technology management. Within these three areas, it was pointed out

that management of technology was an approach that defined the work undertaken by the project team at BreathCo. The overall management of an organisations technology base was considered to come under the area of technological management. Reviewing this literature further, a framework that could be adopted to help a project team was taken from Gregory (1995), and further built on through the work of Phaal, Farrukh and Probert (2001; 2004a, b, c). The framework developed by Gregory (1995) and adopted by Phaal, Farrukh and Probert (2001, 2004a, b, c) needed to be adapted further because while both models consider 'technology management' in a general sense, they incorporate all aspects of an organisations technological base by building on the processes of identification, selection, acquisition, exploitation, and protection. Whilst this literature uses these five processes (ISAEP) as part of their models, they have not been used as a model for management of technology by themselves. This work has attempted to use the five processes as a framework to implement and manage an ISA with an emphasis on learning. An examination of how the SSM<sup>XL</sup> framework could be joined with the technology management process framework was then undertaken.

The framework was labelled Soft Systems Methodology eXpanded for Learning Incorporating Technology Management (SSM<sup>XLTM</sup>), with a discussion being undertaken on how the framework could be used in practice. The SSM<sup>XLTM</sup> framework aims to promote the learning capabilities of individuals. This is achieved through working together and using the learning organization thinking that the framework incorporates in problem explorations. If the project team believe that an ISA may be required, a technology then has to be implemented and managed. The learning that has been undertaken can be built on during this implementation and management phase.

A limitation of this SSM<sup>XLTM</sup> framework is similar to other approaches that have tried to build on the work of SSM, with more objective approaches to ISD. This change in philosophy from the 'soft' to the 'hard' may never be resolved. However, the advantage of SSM<sup>XLTM</sup> comes from the recursive ability that has been built in. Whilst a project team may find undertaking ISAEP processes difficult, or confusing, the SSM<sup>XL</sup> framework could be used to help a project team take action on implementing plans for these aspects of the project. This does not necessarily solve all problems

and issues academically; however, the aim is to provide something practical for a project team to use. Other approaches may not offer such a recursive approach, which is why SSM<sup>XL™</sup> is argued as useful. It is this learning framework which is the main contribution to knowledge that this research presents. As a consequence, the framework has been presented within the literature review chapters of the thesis so to not hide this contribution. The next chapter discusses and details the methodological implications that this work considered in identifying and developing the learning framework within practice.

## Chapter Five: Choice of Research Approach and Methodology

### 5.0 Introduction

This chapter justifies the research assumptions and methodological choices made in this thesis. This chapter opens with an introduction to the possible research strategies by examining the merits of deductive and inductive approaches. Following this using the work of Crotty (1998), an epistemological and theoretical perspective, is stated, briefly reviewed, and justified to the research aims and objectives for this research. The next section examines the choice of methodology, which is one of action research. Saunders, Lewis and Thornhill (2000) state that the different research methods are good at doing different things; therefore, the adoption of action research has to be justified. A general overview of action research therefore is given followed by the specific approach adopted for this study. The data collection methods are discussed and justified with a debate on the limitations of the methods selected before drawing the chapter to a close by providing a description of how the data will be analysed and presented.

### 5.1 The Research Approach

There has been an increase in sophistication of research methods. However, these methods have become less useful in the solving of organisational problems (Susman and Evered, 1978). It is important that the research approach used solves the problems that the organisation faces as well as produces valid research in order to answer the question and objectives of this thesis. Saunders, Lewis and Thornhill (2000) consider that where the research is focused upon developing and testing hypotheses, a deductive approach could be adopted, while the inductive approach lends itself to developing hypotheses through the collection of data. To help draw out the arguments in this area a model, as developed by Todeva (1997), can be used. Figure 5.1 shows Todeva's (1997) model.

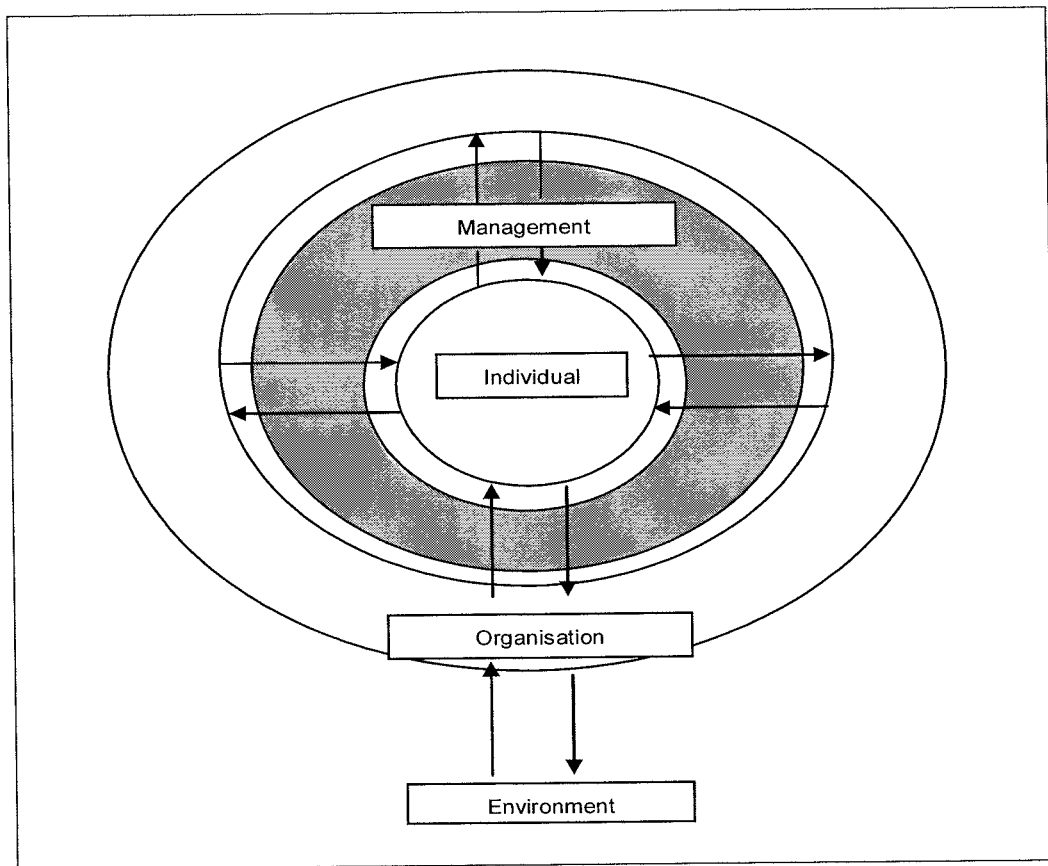


Figure 5.1  
*General Model of the Organisational System*  
 Source: Todeva (1997 P99)

As shown in Figure 5.1 the 'individual' at the centre could be a researcher. By entering into organisational contact with other individuals, management, and the environment allows data to be collected. This can be argued as a more inductive approach to research. The basis of using the inductive approach is as follows. Firstly, the nature of the research question and objectives are geared to gain a better understanding of the problem (Saunders, Lewis and Thornhill, 2000). From understanding the problem, a framework can be produced which will enable a better answer and explanation of the findings of the research. Saunders, Lewis and Thornhill (2000) state the inductive approach is most suitable when the research focuses upon events that are taking place. This is precisely the nature of this study.

An alternative to the inductive approach comes from the deductive approach. The deductive researcher would remain independent of the environment, the organisation, the management and other individuals (Coughlan and Coughlan, 2002; Saunders,



Lewis and Thornhill, 2000) and therefore, would not be represented in Figure 5.1. However, it is argued that remaining completely independent of the environment cannot uncover the richness of the organisation under investigation (Swartz and Boaden, 1997). Russo and Stolterman (2000) point out that researchers should try to avoid limiting the scope of the research by examining already formed assumptions, ideas, and prejudices. If this debate is used, due to the nature of the research question, the choice of methodology leans more to the inductive.

### 5.1.1 Examining the Foundations of Research

The previous section briefly debated the strengths and weaknesses of the two initial approaches which many researchers decide upon and argue for when conducting research. Both approaches have been discussed with one (the inductive) being more favoured than the other (the deductive); but this exercise was used as an initial guide. Crotty (1998), as he argues a research proposal should answer two questions, agrees to an extent with this. These are, firstly, what methodology and methods will be used, and secondly, how they are justified. These two questions have been partially discussed so far. Crotty (1998) continues by stating that the ability to answer the second question (justification) depends upon the research question. The justification in the use of a methodology and methods relate to the “*assumptions about reality that we bring to our own work*” (Crotty, 1998 p32). Burrell and Morgan (1979 p1) support this thinking when they emphasise that “*all theories of organisation are based on philosophy of science and a theory of society.*” These theories need to be explored.

To inquire into the assumptions, a theoretical perspective must be stated (Crotty, 1998). The methods, and the methodology used therefore, relate to the theoretical perspective. Crotty (1998) argues that readers of any research conducted must be able to relate to the outcomes that are presented to them. For readers to be able to relate to the outcomes, an understanding of what human knowledge is and how it can be ascribed must be stated (Burrell and Morgan, 1979; Crotty, 1998). These questions relate to an epistemological perspective (Crotty, 1998). Lewis (1994), however, believes in the usefulness of exploring two extremes of ontology. Burrell and Morgan (1979) regard ontology to be related as to whether the reality under investigation is external to an individual, using consciousness as a form of objectivity, or whether reality is the outcome of consciousness, and the product of an individual’s mind.

These two extreme positions can be summarised as realism (Objectivism) and nominalism (Subjectivism) (Lewis, 1994).

Realism states the existence of an external reality that is structured and exists separately from any observer (Lewis, 1994). In contrast, a nominalist perspective considers reality as never remaining static, being confusing and very complex (Lewis, 1994). No single human being can share the same account of this reality, but can only take account of different perceptions, which are not existing ‘*out there*’ but are socially constructed through values and other beliefs (Lewis, 1994). Applying these two perspectives to this work would indicate that a realist perspective states the problem is given and is structured accordingly, and all that remains is to identify these relationships (Lewis, 1994). Once these relationships have been identified objectively, answering how a learning approach can be incorporated into soft methodologies for the design and implementation of information systems applications can be reached.

In comparison, a nominalist perspective interprets reality through what is socially constructed by using individuals (Lewis, 1994); therefore, it will take into account how an individual (or group of individuals) interprets how a learning approach can be incorporated into soft methodologies for the design and implementation of ISA. This work argues for this participation. Declaring these perspectives will directly relate to the methodology used to obtain new knowledge (Burrell and Morgan, 1979).

Crotty’s (1998) original two questions (what methodology and methods will be used) has now grown into four. Crotty (1998 p3) describes each of the four questions to be answered as:

- *Methods: the techniques or procedures used to gather and analyse data related to some research question or hypothesis.*
- *Methodology: the strategy, plan of action, process, or design lying behind the choice and use of particular methods and linking the choice and use of methods to the desired outcomes.*

- *Theoretical perspective: the philosophical stance informing the methodology and thus providing a context for the process and grounding its logic and criteria.*
- *Epistemology: the theory of knowledge embedded in the theoretical perspective and thereby in the methodology.*

It is important to note that the four questions are not independent of each other.

Crotty (1998) points out that each of the four questions informs the next, as shown in Figure 5.2:

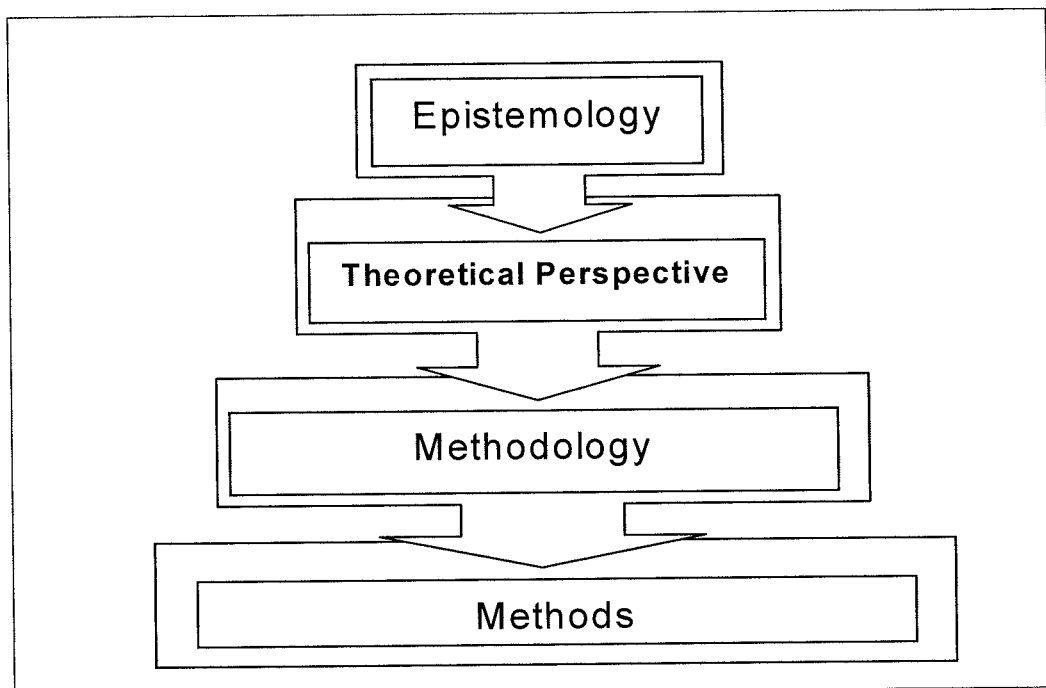


Figure 5.2  
*The Four Elements that Inform a Research Strategy*  
Source: Crotty (1998 P4)

This study takes a research approach that adopts an epistemology of constructionism, which informs a theoretical perspective of symbolic interactionism, which informs in turn a methodology of action research using methods of observations, interviews, document analysis, the Appreciative Inquiry Method's Venn Diagrams, a diary recorded by the researcher, videos, and questionnaires. Adopting the style of Crotty (1998) the research process for this study is shown in Figure 5.3.

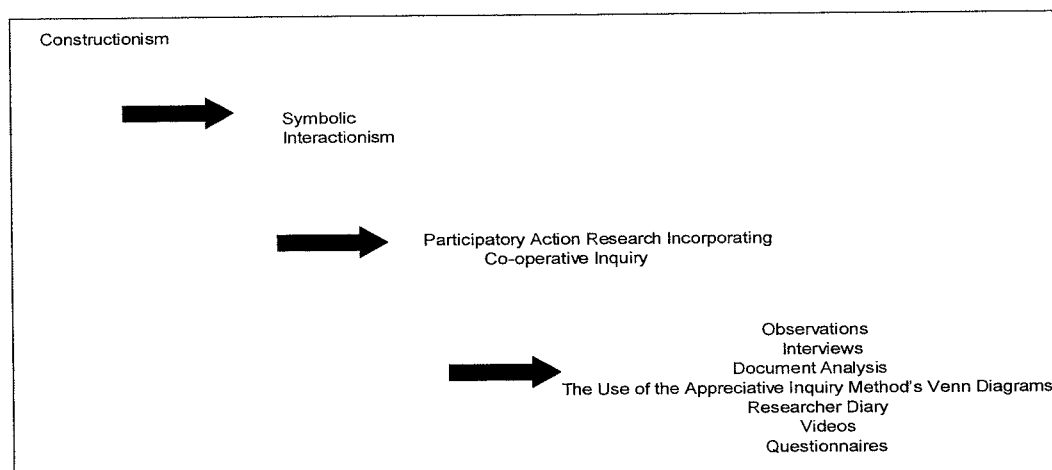


Figure 5.3  
*The Research Process for this Study*  
 Adapted From Crotty (1998)

Crotty (1998) identifies the initial use of qualitative and quantitative approaches as occurring at the depicted level of methods. A strategy using qualitative techniques therefore is a method, and not an epistemology or theoretical perspective. Crotty (1998) argues that many research method books imply that a choice between a quantitative (deductive) and qualitative (inductive) approach has to be justified and these are placed on opposite ends of the scale. The remainder of this chapter will be structured to justify the choice of an epistemological perspective, a theoretical perspective, a methodology, and the methods that have been used for this research. By giving the reader these justifications, and through engaging in these perspectives, it is hoped that the data that has been collected is judged more rigorous and reliable.

## 5.2 The Epistemological Perspective

The epistemological perspective that underpins this thesis is one of constructionism. Constructionism is very different to the traditional objectivist stance located in the positivist area (Crotty, 1998). Nandhakumar and Jones (1997 p110) agree as they comment that constructionism, or as they term it, '*internal realism*' as being the second position of three broad positions, which also includes '*external realism*' (objectivity) and '*subjective idealism*' (subjectivity). From the work discussed so far, the many definitions that philosophy can use to propose similar arguments need to be highlighted. For example, interpretivist research considers adopting either a constructivist or subjective stance (Nandhakumar and Jones, 1997). Whilst

constructionism is stated, the stance is also argued to relate closely to an interpretivist perspective also.

Burr (1998 p14) regards social constructionism as questioning the ideas of '*objective fact*'. Where objectivism states that truth and meaning are independent of any consciousness, constructionism, in contrast, declares that meaning becomes constructed and is not waiting to be discovered (Crotty, 1998). Humans can invent models, occurrences, and other schemes to make sense of experiences, which are then tested and can be modified when new experiences are constructed (Schwandt, 2003). The emphasis on meaning being constructed is why this epistemology is espoused. Learning is a very personal thing (Moilanen, 2001), as well as complex (Kautz and Thaysen, 2001). How each individual learns will be different to other individuals, so by interacting and discussing the same issues, technologies may provide different insights and construct different meanings. If these differences are then further explored, further learning can be achieved. As Crotty (1998 p44) summarises, "*according to constructionism, we do not create meaning. We construct meaning.*"

Burr (1998) states that abandoning any idea of one ultimate truth can be seen as liberating. It can be argued that in abandoning this notion how one individual's construction is more valid than another individual's construction needs to be discussed (Burr, 1998). This is a valid point. In engaging in this debate, Burr (1998) goes on to highlight the notion of relativism/realism issues. While this thesis is not the place to review such deep issues, it is argued that different constructions can be valid as opposed to just one truth. Adopting an epistemology of social constructionism, allows an individual to identify the differences that other individuals possess (Burr, 1998), and will ultimately allow better examination of the use and outcomes of using SSM<sup>XL</sup>. As Burr (1998 p17) states when discussing social constructionism, "*I [Burr] believe that it rightly cautions us against assuming that 'we' (whoever we are) can legitimately speak on behalf of 'them' (whoever 'they' are).*" Considering diversity can only be a positive issue, especially when discussing such issues through discourse (Burr, 1998). Discourse and language are therefore aspects of an individual's use when in engaging with reality, along with practical experiences gained, and limitations faced (Burr, 1998). Collier (1998 p48) can be seen to support this as he argues that "*language not only presupposes access to reality*

*in order to be learnt, it gets its meaning from its relations to the world outside it."*

From this, the language used can be seen as a pointer (Collier, 1998). These pointers should not be ignored, but need to be examined together with language (Collier, 1998). As identified through issues on the learning organization as well the work of Vygotsky (1978) and Wenger (1998) the issue of language was also identified as important. It is not the purpose of this work to go into greater detail on the debates of constructionism but the purpose of this work is to give the reader an insight into why constructionism is a stance taken. Readers are referred to Burr (1998) and Crotty (1998) for such issues. One final perspective on why constructionism has been adopted comes from Montero (1998) who nicely sums up why constructionism is adopted as a valid stance when he says that "*we talk about reality, we invent it in our discourse, and produce discourses about it, we give names to it.*"

### 5.3 The Theoretical Perspective

Figure 5.3 has shown this thesis to adopt a theoretical perspective of symbolic interactionism. Through Burrell and Morgan's (1979) four paradigms for the analysis of social learning (i.e., radical humanist, radical structuralist, functionalist and interpretive), symbolic interactionism can be located within the quadrant of the interpretive paradigm. Klein and Myers (1999 p69) have the same opinion as they take into account IS research to be interpretive when "*... it is assumed that our knowledge of a reality is gained only through social constructions such as language, consciousness, shared meanings, documents tools, and other artefacts.*" It should be noted that symbolic interactionism offers a perspective on life, society and the world we live in: however, this interpretation is very much an American one (Crotty, 1998). Lauer and Handel (1983) state that symbolic interactionism is used to make sense of the world. Symbolic interactionism is one of a number of theories that enables sense making, and it is believed to be the best method for researching and understanding social problems (Lauer and Handel, 1983). According to Crotty (1998 p72) the basic three thoughts on symbolic interactionism come from Blumer (1969 p2):

- "*That human beings act toward things on the basis of the meanings that these things have for them;*

- *That the meaning of such things is derived from, and arises out of, the social interaction that one has with one's fellows;*
- *That these meanings are handled in, and modified through, an interpretive process used by the person in dealing with the things he encounters."*

It should be noted the issues which Blumer (1969) raises are similar to those that Bandura (1977) emphasises with this aspect of learning. Bandura (1977) continues by adding symbols that can be used to represent such issues as an event or a relationship, which can be used as a mode of thought. As has been discussed, "*thinking depends to a large extent upon language symbols*" (Bandura, 1977 p172). It is the symbols which individuals construct with one another, that is argued to be how individuals make sense of their world with each other. What are important are the interpretations of trying to understand the world through subjective experiences (Burrell and Morgan, 1979). Blumer (1969 p1) argues that symbolic interactionism can be described as a distinctive way "*to the study of human group life and human conduct.*"

The three basic thoughts on symbolic interactionism, using Blumer's (1969) descriptions, can be summarised as:

- "*Individuals live in a world of meanings*" (Lauer and Handel, 1983 p30). These meanings are created through events and objects, that an individual responds to, but it should be noted that "*the meanings of events are not static and inflexible*" (Lauer and Handel, 1983 p 30).
- Meaning that comes from the process of interaction with individuals (Blumer, 1969). Concisely "*symbolic interactionism sees meanings as social products, as creations that are formed in and through the defining activities of people as they interact*" (Blumer, 1969 p5). The meanings are not just shared beliefs that individuals hold; they have been jointly created by many individuals (Lauer and Handel, 1983).
- The third and final basic point relating to symbolic interactionism, comes from the meaning that is produced, through the social interaction, and obtained by that individual from the interaction (Blumer, 1969).

The reader is pointed towards the work of Blumer (1967) for greater detail of the above three points. With relation to the literature, it should now be clear why a theoretical perspective of symbolic interactionism has been espoused. By acknowledging the three basic thoughts of symbolic interactionism, the problems and questions the literature has highlighted will allow the investigation of incorporating a learning approach into a soft methodology for IS design and implementation. With the epistemological and theoretical perspectives discussed, we now turn to the choice of methodology used to collect the data to answer the research aim and objectives.

#### 5.4 The Choice of Methodology

The methodology that will be used to collect the data to answer the research aim and objectives is an approach of action research. Action research can be stated to include action, research, and participation (Greenwood and Levin, 1998, 2003). Action research has been described by Checkland and Scholes (1990 p16, original emphasis) as *“involvement in a problem situation and a readiness to use the experience itself as a research object about which lessons can be learned by conscious reflection.”* This involvement rejects the positivist stance of an individual, remaining completely objective. It is important to point out that whilst action research does not conform to the positivist perspective, positivist methodologies are just one way of *“telling stories”* about the area of interest (Denzin and Lincoln, 2003 p15). Due to the nature of action research, it is important that a clear explanation and description of how the primary research will be conducted is given. In order to discuss this issue, the section is broken down into four areas. Firstly, an inquiry is undertaken on the different forms of action research. Secondly, a description of the action research strategy this study adopts is detailed, followed by providing an overview of the methodology used. Finally, a framework is made explicit that explains the action research approach used in this study.

##### 5.4.1 Action Research

Saunders, Lewis and Thornhill (2000) argue that one has to be able to justify the reasons why a research strategy has been undertaken. Baskerville and Wood-Harper (1996) as well as Greenwood and Levin (1998) agree, as they propose that research questions and objectives could be answered using other techniques. The following sections will address this issue, and the reasons why action research is applicable is



made clear, and easy to assess (Lau, 1999). Rationale is given as to why the two organisations that were used were applicable. It is important that this chapter be used to exactly explain the research design, and the processes that were involved. Many researchers (see Baskerville and Wood-Harper, 1996, 1998; Checkland, 1991; Coughlan and Coughlan, 2002; Greenwood and Levin, 1998; Kock, 1997; Saunders, Lewis and Thornhill, 2003; Stowell, West and Stansfield, 1997; Susman and Evered, 1978; Zuber-Skerritt and Farquhar, 2002) regard Kurt Lewin as the originator of action research. Lewin (1946) qualifies research for social practice as not being lower, or less scientific than the pure sciences. This again enforces the validity of action research as a research method.

Action research can be grouped into various streams (see Chiasson and Dexter, 2001), including action research, action science (see Argyris, 1995; Riordan, 1995), and action learning (Zuber-Skerritt and Farquhar, 2002), and has various definitions (Coughlan and Coughlan, 2002; Earl-Slater, 2002; McKay and Marshall, 2001; Mumford, 2001). Action research has been identified arising from four streams, namely the original action research approach, management consultancy, Soft Systems Methodology, and organizational learning (Baskerville and Wood-Harper, 1998). The previous authors continue by commenting that the term action research is stated in each stream but noted to have different meanings (Baskerville and Wood-Harper, 1998). It is important to firstly justify the use of action research over alternative methods in relation to this study, and secondly to interpret the different meanings action research has, finally discussing the precise nature of action research that has been used in this study. Greenwood and Levin (1998) review the many disagreements that are raised by different 'action research practitioners' on the best way to conduct action research. Whilst practitioners adopt terms such as 'participatory action research' and 'action science', it is believed that whenever a researcher declares they are doing 'action research' or various different forms of action research, the approach must require action, research, and learning. While action research is argued to contain more rigour and is more strategic in nature than a strategy of action learning (see Revans, 1972; 1982; 1998) frameworks and advice from these researchers of action research is more readily available.

Through the data collected, this thesis provides a model that managers can use in relation to designing, implementing, and using information systems applications as well as contributing new knowledge to this research area.

#### 5.4.2 Interpreting Action Research

The nature of information systems can be identified as being suitable to use the techniques of action research (Baskerville and Wood-Harper, 1998). The suitability of action research to investigate information systems comes from the many features that the research strategy offers (McKay and Marshall, 2001). Much work has been written about the suitability of action research (see Baskerville and Wood-Harper, 1996; Chiasson and Dexter, 2001; Coughlan and Coughlan, 2002; Davison, Martinsons and Kock, 2004; Gregory, 1994; Kock, 1997; Lau, 1999; Olesen and Myers, 1999; Walsham, 1995). What action research is however, needs to be defined so a strategy of action research can be applied to this study. For example, Stowell, West and Stansfield (1997) consider action research as a diverse area that has produced many meanings. Saunders, Lewis and Thornhill (2000) interpret action research in three ways. Firstly as the management of change, secondly as the relation of practitioners and finally, with implications that inform other contexts (Saunders, Lewis and Thornhill, 2000). This implies that action research has to take each of these processes into account when designing each strategy. In contrast, Altrichter et al., (2002 p128) state:

- *Action research is about people reflecting upon and improving their own practice;*
- *By tightly inter-linking their reflection and action; and*
- *Making their experience public to the people concerned by and interested in the respective practice.*

Whilst this process does not repeat that of Saunders, Lewis and Thornhill (2000), the process of change with participants can be seen within a situation and a process of reflection is undertaken. Secondly, this change and reflection process needs to be written up so other individuals can learn from the experience. While these issues may form an interpretation of what is action research, undertaking them may not be so simple. This may relate to the differences that many individuals attribute to action

research. The difference in opinions of what action research actually is support the use of a framework to be used as an aid for undertaking action research. Baskerville and Wood-Harper (1998) agree, as they examine many studies that announce a strategy of action research and undertake their work without acknowledging the philosophical assumptions of their particular action research approach. As no generally accepted framework on how to carry out an action research strategy exists, it is up to each individual to make explicit how the action research will be carried out. The following section uses a combination of methods and models developed by other authors. These methods have been applied to this study to improve the rigour and relevance that will lead the reader to accept the research approach as valid. It is important to note the differences in frameworks that have been developed in the area of information systems development (Shi and Bennett, 2001) and the reasons different frameworks exist. Shi and Bennett (2001) have classified these frameworks into four categories:

- Frameworks for identification
- Frameworks for comparison
- Frameworks that are used to analyse trends
- Frameworks for examination

A framework for identification examines information systems issues in different contexts; while frameworks for comparison takes the crucial information systems issues as perceived by different groups (Shi and Bennett, 2001). Frameworks that are used to analyse trends incorporate historical and key trends as their importance increases or decreases; while frameworks for examination use factors that can help understand particular influences over information systems issues (Shi and Bennett, 2001).

To answer the research question for this project, a framework based on the fourth classification (frameworks for examination) is stated as applicable. The research is attempting to expand SSM in order to take into account learning organization conditions as a way to enhance learning through IS design. The effect these conditions have on using SSM<sup>XL</sup>, and how the participants interpret such an approach is important. Further to this

consideration of action research and the examination of applicable frameworks, the action research for this study can now be discussed.

#### 5.4.3 The Methodology for this Study

The strategy adopted for this study is that of action research. While the action is involved with using the SSM<sup>XL</sup> framework, Checkland and Scholes (1990) describe SSM as a collaborative framework that incorporates perspectives from many different people. This is important, as Schein (1995) argues action research is usually regarded to come from the researcher, or in his words, the ‘change agent’. How this action will be undertaken with participation from individuals is important. Argyris and Schön (1996) provide an insight that when trying to help individuals while undertaking organizational learning, the activity becomes similar to a study of action research. The researcher becomes part of the situation and therefore sees themselves within the process (Argyris and Schön, 1996). It is important to declare which process of action research is being followed, if it aims to include the participants and not be driven by the researcher – as well as not confusing an action research to streams such as action science, or action learning. Firstly, action learning is uniquely different for each participant (Yoong and Gallupe, 2001). Secondly, it has been noted that action learning is a useful framework, as part of action research, as a tool for learning (Levy and Brady, 1996). To confuse matters further, Thesen and Kuzel (1999) argue the methodologies of action science, participatory action research (PAR), and co-operative inquiry (CI) comes under the general term of participatory inquiry. Whyte (1991) highlights this issue when he points out that using PAR as a label may not be the best solution. It is argued that the elements that come under the term ‘participatory inquiry’ might be confusing, but seems to embody elements suitable for this research and will be referred to under the label of participatory action research, as many writers discuss this form of methodology.

The focus of this study was on the individuals of the same organisation and that the learning was collective and concentrated on change (Yoong and Gallupe, 2001). The stream of action learning considers the researcher to facilitate the group members, while action research focuses mainly on the organisational change process (Yoong and Gallupe, 2001). By using a method of pure action research, and causing this change and recording the results, the research question and objectives would be

answered as well as allowing a model to be developed. However, such a process neglects the participants involved. As Park (2001 p87) states, “*knowledge is power.*” It will be the researcher or senior managers that will receive the benefits of the research while the participants involved do not. In comparison, action learning takes into account the participants, but does not focus as much attention on the change and research process. Also, it is important to recognise the commitment that senior management must place on a methodology of action learning (Newton and Wilkinson, 1994) or on action research. Action research may be perceived more favourably by senior managers who want to cause organisational change, as they can control the agenda and instruct an individual or consultant to carry out their demands.

While each of the above methods may allow the research to be undertaken, this research develops another approach that provides both rigor as well as the relevance that Argyris and Schön (1991) call for. It is argued that focus should be placed on methodologies that provide both participation and action aspects, as well as emancipatory aspects. Being allowed to undertake an action and emancipatory perspective allows for shared ownership of the research project as well as providing useful outcomes for both the research process and the participants involved (Wainwright and Small, 2004). Use of this thinking tried to overcome what Mathiassen (2002) points out as action research helping to obtain access into practice, but controlling the research is still difficult. West and Stansfield (2001) agree, as they are aware that work using action research is increasing, but little is written about identifying and discussing problems when using action research. Wainwright and Small (2004) inquired into developing an approach using a methodology of participatory action research (PAR) and techniques of co-operative inquiry (CI). The approach was specifically aimed at being developed for this research, in response to the criticisms that Jackson (1997) highlights relating to conflict and power. The issues of participatory action research (PAR) and co-operative inquiry (CI) will now be summarised. Finally, an argument is undertaken in proposing that the two approaches, whilst issues can still be raised, are commensurate with each other and can be used as a methodology for this research.

#### 5.4.3.1 Participatory Action Research

Fals Borda (2001) admits that after 1970, people using participatory action research (PAR) were seeking new processes to help aid fieldwork. Fals Borda (2001) continues by stating that PAR wanted to go further than the social psychology perspective, influenced by Lewin (1946), Marxism (see Crotty, 1998 Chapter Six) and phenomenology (see Crotty, 1998 Chapter Four) as well as other participation theories. Thesen and Kuzel (1999) describe this methodology as one which allows participants to control the research process while Whyte, Greenwood and Lazes (1991) perceive PAR as a way that participants within organisations can actively search for new ideas and other information that can help guide action. Successful participatory action research may not lie with method alone, but in how an individual approaches the research (Cornwall and Jewkes, 1995).

Participatory action research can be stated as a process “...*of closing the gap, of remedying the power inequalities through processes of knowledge production, which strengthened voice, organisation and action*” (Gaventa and Cornwall, 2001 p70).

These issues show PAR as a good research process containing action elements. Participatory action research is therefore an approach that attempts to apply a rigorous and relevant approach to collecting data in the field of social science (Fals Borda, 2001). As Park (2001) points out, participatory research is people’s research. As this research is trying to help individuals to design and implement ISA with an emphasis on creating learning activities, the approach can be further argued as relevant.

#### 5.4.3.2 Participatory Action Research and Change

As well as forming a rigorous methodology, Participatory Action Research (PAR), attempts to take account of individual’s knowledge by eliminating language that is specific to a set of people (e.g. researchers or senior managers) and incorporates processes to collectively undertake work with these individuals (Fals Borda, 2001; Kemmis and Wilkinson, 1998), whether they are low level employees or high ranking managers (Whyte, 1991). Language such as this, used within the field of ISD was identified as one problem restricting the participation of individuals in technology projects. Park (2001) agrees, as he offers the perspective that PAR differs from other forms of action research due to the involvement of individuals who are not classed as experts within the research process. The difference can be further emphasised

through Kemmis and Wilkinson (1998) when they give six factors of PAR. These include: PAR as a social process; is participatory; is practical and collaborative; is emancipating; is critical; and is recursive (Kemmis and Wilkinson, 1998).

Since the 1970s, and the initial debate of PAR, three areas presented themselves which are linked to the scientific and emancipatory approach which the technique is trying to create (Fals Borda, 2001). Whilst not wanting to go into greater depth, the three areas can be stated as firstly, the relationship between science, knowledge and reason (Fals Borda, 2001). For example, social science can be constructed and hence is open to reinterpretation; and is rigorous and is comparable with traditional science if undertaken properly (cf. Parks, 2001). The second area is the relationship between theory and practice. For example, objectivity can allow current conditions to be supported through not seeing the change process; and the researcher's mind needs to be freed – which the learning process can achieve, while conforming to the rules of science (Fals Borda, 2001). Finally how the subject and object process relates. For example, allowing the researcher to specify the questions, the data to be collected, and how the findings are to be communicated is unhelpful to participants (Fals Borda, 2001). As is separating the research from the researched. However, through solving this separation of researcher and researched the participative approach is legitimised (Fals Borda, 2001). From these three issues it is argued that PAR is a valid action research method which incorporates participation of individuals, as well as a rigorous approach.

Whilst the three issues form the basis of conducting participatory action research, it is important to point out that PAR is not a fixed process but can change as time moves on and as the situation requires (Gibbon, 2002). Whyte and his associates (Whyte, 1991; Whyte, Greenwood and Lazes, 1991) support this point but add that through a continuous process of change using PAR, organizational learning can also be achieved. Using SSM<sup>XL</sup> with a methodology of PAR may therefore further develop learning organization conditions.

While the above points and issues have been addressed, some problems remain. Firstly, through theory and practice, Fals Borda (2001) does not state how to undertake the two processes. Secondly, within subject and object, the problems of

how to remove the divide between ‘expert’ and ‘client’, and who designs the instruments to collect and analyse the data needs to be taken into account. It is important to try and find a process or technique which can be used to help the research, and the participants to overcome such issues. A methodology known as co-operative inquiry is argued as one framework that can address the previous problems.

#### 5.4.3.3 Co-operative Inquiry

Greenwood and Levin (1998) argue that besides generating knowledge, action research relates to democratic principles and participation. In order to undertake such a task, a change must be made to the role that of researcher and participants (Greenwood and Levin, 1998). A change to these roles is argued as coming from the process of co-operative inquiry. The process of co-operative inquiry can be described as a way to work with people that hold similar concerns, and interests, in order to understand and make sense of the world in new ways, as well as learning how to change things that need changing (Heron and Reason, 2001). Heron (1999 p117) states that “*co-operative inquiry involves two or more people researching a topic through their own experience of it, using a series of cycles in which they move between this experience and reflecting together on it.*” It is argued through the design, implementation, and use of an ISA, that a number of interested individuals need to engage in, and cover such aspects.

Co-operative inquiry can be seen as different to other research approaches for the following reasons. Most research approaches are undertaken by a researcher who holds all the ideas, and uses the techniques they believe appropriate to solve the research problem (Heron and Reason, 2001). Heron and Reason (2001) go on to point out firstly, that this way of conducting research does not connect the researcher/s’ area of thinking with the people who are being researched. Secondly, other research approaches tend to focus upon theory rather than practice (Heron and Reason, 2001). These arguments could be aimed at the SSM<sup>XL</sup> framework developed. The researcher developed and justified the expansion and wants to use it in practice. It has been argued that the approach is not designed for use by the researcher, but is to be used to help with participation in an ISA project. Heron and Reason (2001, p179) argue that “*good research is research conducted with people rather than on people.*” This is the purpose of this research and use of SSM<sup>XL</sup>. From this perspective, co-operative



inquiry promotes a co-operative relationship between researcher and the researched, to becoming co-researchers as well as co-subjects in the research process (Heron, 1996; Heron and Reason, 2001).

*The Structure of Co-operative Inquiry:*

Heron and Reason (2001) describe co-operative inquiry as a process of cycling through four phases of reflection and action (see Heron, 1999 and Heron and Reason, 2001 for a fuller description). These cycles can be argued to help in undertaking the stages SSM<sup>XL</sup>, whether it is deciding if an area is a problem that needs to be addressed and further structured, to modelling, and finally taking action to improve the problem situation. In order to do this, action needs to be taken, using data collected and presented to all co-researchers, so that a dialogue and shared language can form. How well this worked in practice needs to be seen, but how to start a co-operative inquiry needs to be identified.

*Initiating Co-operative Inquiry:*

Co-operative inquiry can be initiated in a number of ways. Heron and Reason (2001) explain one way as being researcher led. Researcher/s who understand the method select the topic and co-opt other individuals who are interested in joining and undertaking the inquiry (Heron and Reason, 2001). A second way to initiate a co-operative inquiry is to learn how to undertake the process through books and other research on the topic, and learn the technique together (Heron and Reason, 2001). It can be stated that the co-operative inquiry for this study was researcher led, as the researcher had knowledge of co-operative inquiry, and wanted to use the approach as part of a methodology in co-opting co-researchers, who in turn wanted to design and implement an IS through using the SSM<sup>XL</sup> framework. To help explore the type of inquiry performed, a focus upon the role of the individuals within the inquiry can be undertaken. Some of these inquiries can be listed as same role, reciprocal role, counterpartal role and mixed role inquiries (Heron and Reason, 2001). Table 5.1 gives a brief example of each.

Inquiry Method	Example
Same Role	Individuals who hold the same status. For example, doctors examining their practices.
Reciprocal Role	Individuals of two or more that inquire into a practice that is of equal status i.e. two friends.
Counterpartal Role	Individuals of two groups that come together in an expert/client relationship i.e., doctors and their patients.
Mixed Role	An inquiry that includes different kinds of experts i.e., doctors and dentists.

Table 5.1

*The Role Individuals can play in an Inquiry*  
Adapted From Heron and Reason (2001)

Using Table 5.1, the role of individuals in this inquiry is one of counterpartal, as the two groups represent the researcher coming together with participants of the organisations. As well as the different inquiry methods, attention has to be paid to where the action phase will take place. An 'inside' inquiry can be described as one where the action phase takes place within the group, at the same time as focusing upon issues within that group (Heron, 1996; Heron and Reason, 2001). In contrast, an 'outside' inquiry keeps the issues that are related to individuals working, or other personal issues, outside the meetings (Heron, 1996; Heron and Reason, 2001). As the inquiry takes place outside of the meetings, the meetings that take place are to be used for reflection and discussions on the data collected (Heron and Reason, 2001). Once this has been undertaken, the next action phase commences (Heron and Reason, 2001). The research was carried out this way due to the desire of the participants within the organisations for the projects to commence with meetings being used to discuss the work undertaken outside of the inquiry.

While these issues have been identified, it is important to try and identify the political involvement of the research process, argued as necessary to keep in mind if the researcher bias or other bias is to be removed. Thesen and Kuzel (1999) agree, as they are aware of the challenges of such an approach being related to being able to observe and interpret group issues, as well as maintain group dynamics. The varying degrees of participation and engagement that researchers take as subjects in the research (co-subjects), and conversely, that subjects take as researchers in the project

(co-researchers) has been developed by Heron (1996, 1999) and can be seen in Table 5.2.

		<b>Researcher</b>	<b>Subject</b>
<b>Political Participation</b>  Involvement in research thinking and decision making	A	Full	Full
	B	Full	Partial
	C	Full	Nil
<b>Epistemic Participation</b>  Involvement in experience and action being researched	D	Full	Full
	E	Partial	Full
	F	Nil	Full

Table 5.2

*Kinds and Degrees of Participation in Co-operative Inquiry*

Source: Heron (1999 P118)

Through Table 5.2, Heron (1999) illustrates the various forms of engagement in terms of 3 levels of participation; full, partial and nil, divided into two domains comprising political participation (decision-making about the research project itself) and epistemic participation (involvement in action and experience of the project). The co-operative inquiry element of the methodology (the ‘how’ to go about change) (cf. Wilson, 1984) is through understanding the political and epistemic approaches, whilst the participatory action research (the ‘what’ to change) (cf. Wilson, 1984) allows the change process to be undertaken. By use of Table 5.2, the research process can be held up to these issues and any changes noted, with the outcomes having to be explored. For example, a co-operative inquiry will follow a participation path of ‘A’ (researcher full/subject full) and ‘D’ (researcher full/subject full) (cf. Heron, 1996). As the research commenced, different degrees of participation were engaged in. Table 5.2 was helpful in considering these processes, with the reasons why being explored. Through undertaking such a process, use of the techniques of co-operative inquiry can be attempted within both cases.

#### 5.4.3.4 Synthesis and Commensurable Issues of Participatory Action Research and Co-Operative Inquiry

This section has given an overview of the areas of participatory action research (PAR) and co-operative inquiry (CI) and how they were applied to this research. Throughout the review, and discussion, it should be noted that each area could be used to collect

data on its own. The underlying influence of participatory action research (PAR) comes from firstly, the action that is involved in changing a perceived problem situation and, secondly, the action being achieved by eliminating language and other processes that are specific to a set of people in order to conduct the research (Fals Borda, 2001). The research is then conducted with these same individuals. This eliminating of language can be argued as the removal of dominating influences and oppression which other individuals may use for example as a form of power. For this research, it involved removing the barrier that participants may believe exists in designing and implementing ISA, and how these participants can become involved in such a process.

Participatory action research would provide a rigorous and relevant methodology that removes dominating influences from the research process, such as social, cultural and history (Kemmis, 2001); and the outcomes of the research are reported in a way that is understandable by all (Fals Borda, 2001). Senior management, however, may initiate the study or decide if the study can be conducted and it will be the researcher's job to carry it out in association with the individuals whom the research is focused upon. Even if there is acknowledgment of the history, culture, and social aspects, it will ultimately be up to the originators of the research (senior management or the researcher) to accept or reject the outcome of the study. Thesen and Kuzel (1999) agree, as they state that while laying an approach to oversee such issues, this does not guarantee that the issues of power and control will effectively be removed. For example, if the researcher is the first participant to interpret the data and provide the feedback, it may be used as a form of power and control (Thesen and Kuzel, 1999). The researcher could therefore be used as a tool for management to uphold the status quo and legitimise their dominance further. A framework which allows the underlying principles that participatory action research espouses (see Fals Borda, 2001) was sought.

The issues relating to co-operative inquiry found that all participants involved in the inquiry are equal participants, with no one perspective dominating others. It is argued that using participatory action research, with co-operative inquiry will dissolve the paradox of the research process being used by management to legitimise a dominant agenda. This thinking comes from the outcome of the inquiry. Everything about each

phase of the inquiry will be conducted with the co-researchers (the participants). As well as providing the outcomes with the co-researchers, how they will be reported has to be agreed between all individuals, including the researcher. In this way, dominance and language that all individuals can understand can be removed, with dialogue and language being created which all individuals can understand. To accompany this, the research is being conducted in a framework of participatory action research that removes any possibility of the research being used for other means that the co-researchers (the participants) do not wish. Undertaking the research in this way tries to improve the situation that is under investigation, for all individuals concerned (as well as the researcher). The researcher is just another co-researcher bringing ideas that could be accepted, explored or rejected. It is hoped one of the ideas brought and explored is the SSM<sup>XL</sup> framework. This however, is not guaranteed to be accepted by the co-researchers.

Thesen and Kuzel (1999) state that a researcher trying to engage participation with individuals should undertake a stakeholder analysis of participants who would gain and lose from the outcomes of the research. This would then allow the researcher to make sure that all participants have an opportunity to participate and present their perspective. The main problem with this is given by Thesen and Kuzel (1999) in that no researcher can empower participants: they must do this for themselves. The problem will be using SSM<sup>XL</sup> (if it is deemed helpful by the participants) in a practical situation whilst still holding the emphasis of participatory action research and co-operative inquiry. The problem relates to what Heron (1996 p24) point out as “*the partial form of co-operative inquiry*” that allows co-researchers and co-subjects to collaborate more or less with aspects of thinking and doing. Whilst this is accepted, it is argued that PAR overlaps (cf. Heron, 1996). Heron (1996) states that co-operative inquiry is complementary to participative action research through the dominance and power that needs to be taken into account and removed. The research could be charted to move backwards and forwards thorough the process of PAR and CI. Due to this, certain points in the research may not be pure PAR or CI but the methodology of using both will still remain. It is argued that as organisations involve individuals who see things differently, using a methodology of just PAR or CI removes the possibility of identifying different accounts of the same situation. As Checkland and Scholes (1990) state, any situation that forms part of human affairs which are drawn

from history can contain numerous accounts. It is necessary that history is drawn out and learnt from (Checkland and Scholes, 1990) and this is what the methodology has set out to do.

Conducting research in the manner will present researchers with many challenges and issues (Wainwright and Small, 2004). A table is provided outlining the commensurate and incommensurate issues of participatory action research and co-operative inquiry that summarises the points made by the writers referred to through this section. This is shown in Table 5.3.

	<b>Participatory Action Research (PAR)</b>	<b>Co-Operative Inquiry (CI)</b>
<b>Commensurable Issues</b>	Provides an opportunity for individuals to engage in organizational learning. Provides opportunity for action and research relevance.	All individuals work together as co-subjects and co-researchers in their own right. Critically reflexive Enhanced discourse Maximises participation and ownership
<b>Incommensurable Issues</b>	Researcher could be used to fill hidden agendas - managerially instrumentally driven. Expert researcher driven Lack of research rigour – not generalisable.	A method for 'educated subjects and professionals. No overt agenda for countering oppression and conditions of injustice.

Table 5.3

*The Commensurable and Incommensurable Issues of PAR and CI as a Methodology for this Research*

Adapted from: Wainwright and Small (2004)

Table 5.3 has been used to inquire into the issues that this research has investigated, but also draws out the issues that may allow the approach to be criticised. Through focusing upon the commensurable issues, a combined action research methodology was created and used to collect the data required to answer the research question and objectives for this research project. Following on from the many issues discussed in this chapter so far, it is argued that a framework displaying these will give clarity on the processes undertaken.

#### 5.4.4 The Explicit Framework for this Study

The overall methodology has been discussed previously within this thesis, as well as the methodology to be used for using SSM<sup>XL</sup> process where these issues can be stated

to relate to the action aspect. In making the research aspect more explicit, a framework detailing the purposeful outcomes needs to be declared (Checkland, 1991). By doing so, it is argued to avoid that which Greenwood and Levin (1998) consider as making action research unscientific, as well as avoiding what Stowell, West and Stansfield (1997) describe as researcher bias. The purpose of this section is to display the framework that was used for undertaking the research which came out of this study “*more than making anecdotal accounts of what happened*” (Checkland, 1995 p2). To help researchers within information systems, Lau (1999) has developed a framework that presents an individual with a series of questions to answer. If the questions are addressed, the quality of the action research may be improved. A second advantage of this framework is that it provides the reader with an overview of the two cases used and the projects that were undertaken. For a description of Lau’s (1999) framework, see Lau (1999). The framework as developed by Lau (1999), when applied to this research project can be seen in Table 5.4.

For this Research Project	
Dimension And Criteria	
<b>Conceptual Foundation</b>	
Aim/Question	How can a learning approach be incorporated into soft methodologies for the design and implementation of information systems applications (ISA)?
Assumptions	<ul style="list-style-type: none"> <li>Objective ISD methodologies use IS specialists to design and implement IS with little participation from the users of the planned technology.</li> <li>Participation of end users improves the chances of an ISA being successful.</li> <li>Client-led design is more epistemological and practical in allowing participation to designing and implementing ISA.</li> <li>Learning activities can be created through such processes.</li> <li>Soft methodologies that adopt these principles need to be further reviewed.</li> <li>One such methodology can be used to enhance the learning capabilities of individuals.</li> </ul>
Perspective/Tradition	Constructionism and Symbolic Interactionism.
Stream	Participatory Action Research (PAR) with Co-Operative Inquiry (CI).
<b>Study Design</b>	
Site	<p>BreathCo: Manufacturing organisation of gas detection and breathing apparatus. BreathCo is a medium sized organisation operating in the private sector. All research conducted on BreathCo site. BreathCo invited all participants that could contribute to be on the project, and hence be part of the research.</p> <p>HealthCo: A group of National Health Service (NHS) hospitals forming the Newcastle Trust. All research was conducted at the HealthCo sites. All participants identified having appropriate information on the starter/leaver process were contacted and asked to participate in the project. All participants were happy to contribute.</p>
Background	<p>BreathCo:</p> <ul style="list-style-type: none"> <li>June 2002 – First contact.</li> <li>June 2002 – Minor meetings take place through this period.</li> <li>March 2003 – First contact with employees at BreathCo research day.</li> <li>Late March 2003 – First visit to the organisation took place.</li> <li>May 2003 – Meeting with operations manager.</li> <li>Customer complaints/concerns project identified.</li> <li>Participants found the customer complaints difficult and invited the researcher to participate.</li> </ul> <p>HealthCo:</p> <ul style="list-style-type: none"> <li>November 2004 – First contact in this period.</li> <li>Problem related to exploring and suggesting who should implement the required new smart card project.</li> </ul>



Dimension And Criteria	For this Research Project
Background continued	<ul style="list-style-type: none"> <li>Research recommended who should implement this process and the outcomes of such recommendations.</li> </ul>
Intended Change	<ul style="list-style-type: none"> <li>To allow participants within an organisation to use a framework to participate in IS design and implementation where necessary.</li> <li>To allow participants to see processes that may not be highlighted through using other approaches.</li> <li>To allow individuals to use the process to create learning opportunities and activities.</li> </ul>
Participants	<p>BreathCo: Participants within the research included: Customer services, engineering, technical support, quality, repair workshop, product support, product development, IT. These participants were invited to join the project as they represented areas that could receive external or internal customer complaints/concerns.</p> <p>HealthCo: Participants within the research included: Information manager, workforce planning manager, human resources employee, IT manager, security manager, medical staffing employee, IT security manager, senior staff nurse, personnel director, IT project manager and an IT security employee.</p> <p>BreathCo: Observations, interviews, document collection, researcher diary, videos, questionnaires, and the Appreciative Inquiry Method's Venn diagrams.</p>
Data Sources	<p>HealthCo: Observations, interviews, document collection and researcher diary.</p> <p>BreathCo: August 2003 until January 2005.</p>
Duration	<p>HealthCo: November 2004 until September 2005.</p>
Degree Of Openness	<p>The research approach was made clear in both projects. However, as much participation in using the research theory was encouraged at all times.</p> <p>Using SSM<sup>xi</sup> was a more formal for tool for investigating how the approach could be undertaken when the researcher left each organisation. The development aspect of each project was more open.</p>
Access/Exit	<p>BreathCo:</p> <ul style="list-style-type: none"> <li>Informal access built up from the research day.</li> <li>Formal access obtained through the meeting with the operations manager.</li> <li>Formal access to the project obtained when invited to join the customer complaints/concerns project during a two-week observation of the organisation.</li> <li>Exit agreed with project leader after the ISA had been implemented and final interviews were undertaken with the users of the technology.</li> </ul> <p>HealthCo:</p> <ul style="list-style-type: none"> <li>Informal access obtained through a colleague of the researcher's second supervisor.</li> <li>Formal access obtained through meeting with the information manager and discussing the aims of the research and the identification of a suitable project.</li> <li>Exit agreed on completion of a report on the starter/leaver process and follow up interviews.</li> </ul>

For this Research Project	
<b>Dimension And Criteria</b>	
<b>Presentation</b>	<p>Presentation issues will take the form of:</p> <p>Chapter Six: description of the work undertaken in BreathCo and the issues that became crystallised.</p> <p>Chapter Seven: analysis of the approaches used.</p> <p>Chapter Eight: focusing on how the project team at BreathCo implemented, and managed the concerns technology and what learning such approaches can bring.</p> <p>Chapter Nine: description and analysis of the HealthCo case with discussion on the issues the entire research process uncovered.</p>
<b>Role Expectations</b>	
<b>Researcher</b>	<p>Provided knowledge of IS development and learning organization theory. The researcher mobilised participants to engage with the researcher in collaboration and not use the researcher as the expert of the problem situation.</p>
<b>Participants</b>	<ul style="list-style-type: none"> <li>• The SSM<sup>xt</sup> framework was designed to be used by participants.</li> <li>• Research process used co-operative inquiry to allow participants to control the research process.</li> <li>• Participants decided relevant course of action over research project.</li> </ul>
<b>Competency</b>	<p>Participants at BreathCo stated that the tools and techniques used were useful and could be used again in future projects. Participants at HealthCo stated the techniques used were useful and incorporate similar practices now. One participant at HealthCo argued that the approach used was good, as it allowed individuals to think about current practices and how they could be improved.</p> <p>Participants in both cases undertook the research through the participatory approach adopted, but could be identified through the social aspect of learning argued for.</p> <p>Through the research process at both cases, a majority of participants have become more aware of processes that can be used in ISD projects, as well as identify where other processes within their organisation may need to be focused upon.</p> <p>The IT manager at BreathCo believed the framework could be used again. Due to issues of culture and history within BreathCo, the learning organization thinking and theory adopted would be difficult to maintain. The participants at HealthCo never really gave a definitive answer but embraced the approaches positively especially a call for participation and how ISA are implemented.</p>
<b>Ethics</b>	<ul style="list-style-type: none"> <li>• Both organisations and participants have been anonymised; hence, they are referred to as BreathCo and HealthCo, even though both organisations did not object to being named in the research.</li> <li>• The research aimed at generating learning activities through IS development. These processes are aimed at improving an individual's quality of life and allowing them to have their say over ISA.</li> <li>• Both projects were selected as they related to decision-making on IS developments, but the outcomes would not relate to job loss of any description or be used by management for ulterior motives.</li> </ul>

Table 5.4

*The Unifying IS Action Research Framework for this Study*  
Adapted From Lau (1999)

Table 5.4 has been adopted as a way to assess the criteria for claiming the work as action research. Other problems to be aware of concern the co-ordination of and links between theories, the methods selected, the data that was collected, and the model that was created (Baraldi and Bocconcelli, 2001). It is important that this action research strategy maintains a scientific approach even though organisational issues (Coughlan and Coughlan, 2002), and the individuals who experience them, are of prime importance.

The research process adopted takes into account what Earl-Slater (2002 p138) perceives as a “*look, think, act process*,” identifying what was drawn on and developed within the literature review and what is happening in practice. Lewin (1946) identifies the first step of an action research strategy as examining the idea by whatever means are available. Secondly, fact-finding is then undertaken; and from the combination of the two processes, a plan on reaching the objective and a decision concerning the first step are achieved (Lewin, 1946). The purpose of the fact finding is to see if the intended plan is as expected; secondly, what comes from the fact finding allows learning to take place; thirdly, the next step can then be planned, and finally a modification to the general plan can be undertaken if required (Lewin, 1946). In comparison to this perspective, a process that seems to be highly referenced when discussing action research, comes from Susman and Evered (1978). The model consists of five phases: diagnosing, action planning, action taking, evaluating, and specifying learning (Stowell and West, 1994; Susman and Evered, 1978). Susman and Evered (1978 p588) state each stage as:

- *Diagnosing: Identifying or defining a problem.*
- *Action Planning: Considering alternative courses of action for solving a problem.*
- *Action Taking: Selecting a course of action.*
- *Evaluating: Studying the consequences of an action.*
- *Specifying Learning: Identifying general findings.*

Susman and Evered (1978) conclude by stating that each phase must be addressed for an accurate definition of action research. Stowell and West (1994) add that the

complete approach allows for continuous learning that is different to the positivist approach. The SSM<sup>XL</sup> framework developed within Chapter Four could be argued as a technique to diagnose, action plan, take action, and allow an evaluation and learning activities to be specified.

What Lewin (1946) and Susman and Evered (1978) are referring to above is the research process, which should be noted, is missing from Table 5.4. This is a conscious omission, as these issues are argued as the most important in justifying a strategy of action research and need further discussion. Lau (1999) states the research process to include problem diagnosis, action interventions, reflective learning, and iteration. Whilst in comparison referring back to participatory action research, Kemmis and Wilkinson (1998 p21) state that the cycles involved in undertaking participatory action research include: *“planning a change, acting and observing the process and consequences of the change, reflecting on the processes and consequences, and then re-planning, and so forth.”* The similarity between the research process of Lewin (1946), Susman and Evered (1978), Lau (1999) and Kemmis and Wilkinson (1998) should be noted.

While Lewin (1946), Susman and Evered (1978) and Lau (1999) discuss action research, Kemmis and Wilkinson (1998) discuss participatory action research. It is argued that while different approaches to action research exist, they all embody similar cycles that need to be declared and planned for. From this thinking, the research process highlighted by Saunders, Lewis and Thornhill (2003) who adopt Thornhill et al's., (2000) work, offers yet another perspective that an action research study needs to address. The process contains six stages, namely initial idea and criteria for change intervention, reconnaissance (fact finding and analysis), plan action steps for the intervention, implement planned action steps, monitor implementation and finally evaluate (Saunders, Lewis and Thornhill, 2003 p95). This study adopts these processes as the research process. The complete research process can be seen in Appendix C. Due to the detail produced, it was not practical to present the complete table here and as an alternative, Table 5.5 gives a summary of the BreathCo case with Table 5.6 providing a summary of the HealthCo case.

Phase	Cycle One	Phase	Cycle Two	Cycle Three
Initial idea and criteria for change intervention	Can SSM <sup>XL</sup> be used to enhance learning capabilities of organisations when designing and implementing ISA?	Revise change intervention as necessary	As the project was driven by the stream of participatory action research, which also involved co-operative inquiry (CI), it would undermine the approach to try and influence the participants to undertake root definitions and the conceptual model building espoused in SSM, as they were not keen.	This phase of the action research cycle relates to training, observing the technology in use and evaluating the complete process.
Reconnaissance (fact-finding analysis)	From this observation, a project that met the aim of the research emerged. This project was initially entitled the 'Customer Complaints Management System'.	Amend planned action steps	If an ISA solution was designed, it needed to be brought into the organisation. How this would be done needs to be managed. The SSM <sup>XL</sup> framework does not incorporate these processes.	Formal interviews after a period of use to evaluate the processes undertaken throughout the project concerning the design, implementation and use of the ISA with both the development team and other participants.
Plan action steps for intervention	It was decided that an initial investigation into the problem of customer complaints should be undertaken by the researcher, which could then be fed back into the team. The investigation into the problem led to the planned action steps. The appreciative inquiry method (AIM) (see West, 1995) work sheet and semi-structured interviews were planned to collect the data, along with further observations to help structure the problem situation.	Implement planned action	The implementation of the ISA took the form of prototyping, where the developer would produce the technology for the team to test and feedback the findings.	The semi-structured interviews were also being constructed for the final aspect of the research with users and non-users of the technology.
Implement planned action steps	The data collection methods were designed to be used to build the base of sharing a dialogue relating to the problem of 'customer complaints'. This work was undertaken during October 2003. The SSM <sup>XL</sup> framework proceeded through the stages in order to help focus the project and the researcher. The AIM (Appreciative Inquiry Method) work sheet was produced and	Monitor implementation and effects	When the developer is not present, a more thorough inspection and testing procedure is underway. This is to check for consistency in the fields, forms and the aesthetics of the system. It was noted that the team in undertaking this process, could be a community of practice.	On reviewing the concern logs, it could be seen that more and more individuals were logging more and more concerns. This could be argued that the technology was a success, as concerns that may not previously have been recorded are now being recorded. It is from these concerns that BreathCo hopes to further learn about its business and problems that need to be corrected.

Phase	Cycle One	Phase	Cycle Two	Cycle Three
Implement planned action steps continued	collected back and the semi-structured interviews were undertaken.			
Monitor implementation effects	This process seemed to be easy to undertake by all members of the team, as they could firstly complete the sheet from their own perspectives and secondly, not take up too much of their time. In return, the researcher got an initial insight into each participant's thinking upon the problem situation as well as demonstrating the many differences that each participant held upon what is important in solving the problem.	Evaluate	Whilst the first phase of the research used SSM <sup>XL</sup> and the tools used to help focus the project, it is also argued that it helped generate learning activities. This second aspect of the research did not have such a framework, or tools, and is acknowledged to not create as many learning activities.	The language problems identified were supposed to be discussed during the early parts of the framework, which were argued as applicable by the participants. Once the technology was implemented this issue still seemed not to be resolved. These issues therefore were brought out in the analysis.
Evaluate	It is argued that the tools used have helped develop learning activities about the problem situation, and other process within BreathCo.			

Table 5.5

*A Summary of the Research Process for the BreathCo Case*  
Adapted From: Thornhill et al., (2000)

Phase	Cycle One	Phase	Cycle Two
Initial idea and criteria for change intervention	From the outcomes of BreathCo case, the technology management aspect was considered as a process that can help participants within an ISA project. Can the full framework therefore be used to help design, develop and manage an IS project as well as generate learning activities?	Revise change intervention as necessary.	This case was selected to re-test the framework. Due to the suspension of the smart card project, this was not possible. A process of examining the applicability of the technology management process, argued for as useful, needed to be found.
Reconnaissance (fact-finding analysis)	Participants allowed the researcher to sit with them while they explained their role. The problems participants face and their thoughts on the smart card in general, and how it may affect their role, were also recorded.	Amend planned action steps.	As the final framework could not be fully re-tested, a process of examining the applicability of the technology management framework and its use in generating learning activities for undertaking IS management will be undertaken.  The project leader helped the researcher identify a number of potential participants who would have interesting opinions and issues of technology management within HealthCo.
Plan action steps for intervention	The project of investigating the starter/leaver process, with relation to the smart card implementation was deemed straight forward. It was decided to adopt a process of data gathering from unstructured interviews. If participants could not answer a question, a plan to find out who would know was drawn up. This individual will then be contacted to see if they would like to participate in the study.	Implement planned action.	The interviews were arranged on different days in the month of September 2005.  The interviews comprised a number of themes, and topics, relating to the aspects highlighted as being important for technology management, and the framework adopted for this study.
Implement planned action steps	Documents were collected on current processes such as obtaining a current ID badge.  The main methods of interviews and observations were used.  AIM was attempted but the statements posed were too structured and therefore, participants had difficulty in completing them.  From the interviews transcribed, the first two stages of SSM <sup>xi</sup> were undertaken and was hoped that model building would be undertaken with participants of the project. Informal chats with the project leader implied that the researcher needs to undertake the modelling aspects.	Monitor implementation and effects.	While IS management can take many forms, there seems to be a number of processes that can be undertaken.  In some cases, ISA can be implemented from the bottom-up, which is argued where the most use will come from the complete framework. These particular projects incorporate participation from potential users and other individuals that the technology will affect.

Phase	Cycle One	Phase	Cycle Two
Monitor implementation effects	<p>While the processes involved in constructing the systems models helped focus the researcher, it was argued that it may be confusing to participants as no time was made available to discuss the framework formally, and how to construct root definitions, CATWOE's and conceptual models.</p> <p>A software package called IDEFO was used to show the transformation processes of current practices, and how these may be altered, depending on the choices that will need to be taken to improve the problem situation.</p> <p>The report was presented informally to the project leader. He seemed happy with the work that was undertaken, the modelling undertaken, and the recommendations made.</p>	Evaluate.	<p>Both cases provided insight and contributed to the refinements of an approach to design, implement, and manage an ISA.</p> <p>The framework proposed is argued to be effective for teams designing, implementing, and managing an ISA.</p> <p>The framework is argued to generate learning activities through the processes the framework incorporates.</p> <p>A case is sought where the complete framework can be undertaken. Participants need to fully collect, develop models and identify, select, acquire, exploit and protect and evaluate the IS has to be undertaken.</p>
Evaluate	<p>Undertaking SSM<sup>KL</sup> with only an emphasis on participatory action research, without co-operative inquiry, has to be undertaken in more of a mode 2 perspective.</p> <p>Undertaking SSM<sup>KL</sup> with only an emphasis on participatory action research, without co-operative inquiry, allows the stages to be undertaken more smoothly and quickly.</p> <p>Without the co-operative elements, it is unknown what other data has been missed that would have altered the thinking of the researcher and the other participants if it had been uncovered.</p>		

Table 5.6  
*A Summary of the Research Process for the HealthCo Case*  
 Adapted From: Thornhill et al., (2000)



From Tables 5.5 and 5.6, it can be seen that the action research process incorporates a number of cycles. The BreathCo case (Table 5.5) utilises a three cycle process, exploring the use of SSM<sup>XL</sup>, how the IS will be brought into the organisation, and finally issues relating to training, use, and evaluation of the entire process are addressed.

Table 5.4 was used as a basis to enter each organisation and for discussing the possibilities in conducting research. This was to ensure, what Mumford (2001) describes as having clear and agreed knowledge, so, everybody knows what is taking place. As well as clarifying the research plan, it is also important to include a statement of the theoretical underpinnings to avoid leading the organisation into thinking the project is primarily consultancy (Baskerville and Wood-Harper, 1996; Stowell, West and Stansfield, 1997). This was clearly emphasised. The action research approach could be classed as what Stowell, West and Stansfield (1997 p174) label as adopting a '*field study mode*', as the purpose was to learn about the ideas developed in the literature review and apply them in a practical setting. Finally, Tables 5.4 – 5.6 have been designed to improve the generalisability of the research process used. As Schofield (2002 p174 underline is emphasis in original) states, "*the goal is not to produce a standardised set of results that any other careful researcher in the same situation or studying the same issue would have produced. Rather it is to produce a coherent and illuminating description of and perspective on a situation that is based on and consistent with the detailed strategy of that situation.*" Through the process laid out it is argued that this has been undertaken.

Through informal chats, the use of the action research document (Avison, Baskerville and Myers, 2001; Mumford, 2001) was discussed with the senior individuals, as well as participants involved in the problem situation when the projects were formally identified. This can be argued as the initial step before proceeding to stage 1 of the SSM<sup>XL</sup> framework developed. To accompany Lau's (1999) adapted framework shown in Table 5.4, a model depicting the action research strategy can be seen in Figure 5.4.

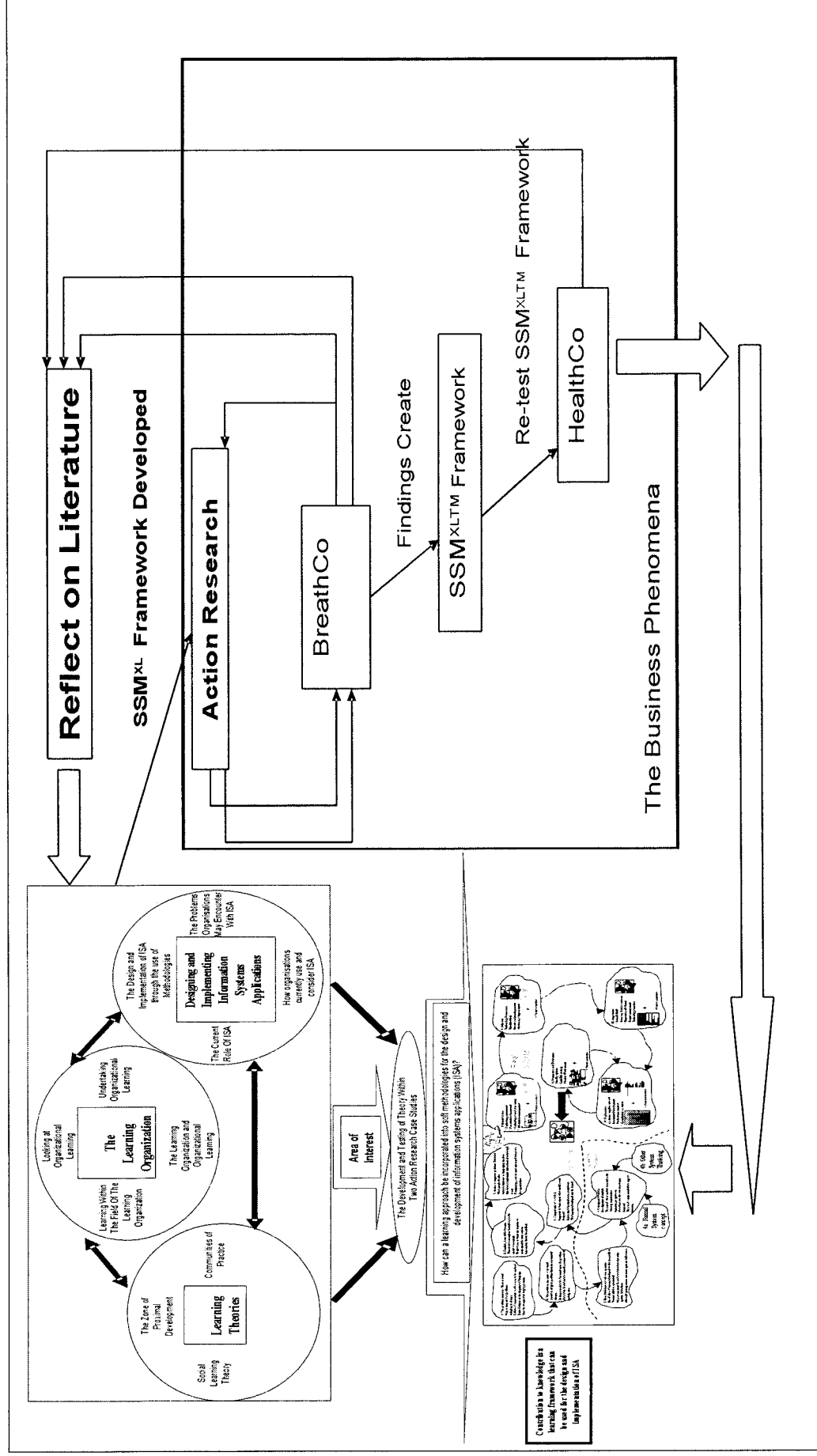


Figure 5.4  
*The Action Research Strategy for this Study*

Figure 5.4 displays pictorially the action research strategy depicting two cycles. The SSM<sup>XL</sup> framework was one aspect of the research. The second aspect considers how the IS was implemented, and managed, with an evaluation of the entire process then carried out. However, it should be noted that in the BreathCo case, it was declared that a three-cycle process was undertaken. The findings of the BreathCo case allowed a new framework to be developed, argued to help organisations design, implement, and manage ISA with an emphasis on learning. This framework is re-tested in HealthCo. This can be stated as using the first case (BreathCo) to capture how well the theory developed worked, whilst the second case (HealthCo) was used to see what factors were similar or different (cf. Aita and McIlvain, 1999). From the issues declared in Tables 5.4 to 5.6, the research takes the form of Checkland's (1991) process for action research shown in Figure 5.5.

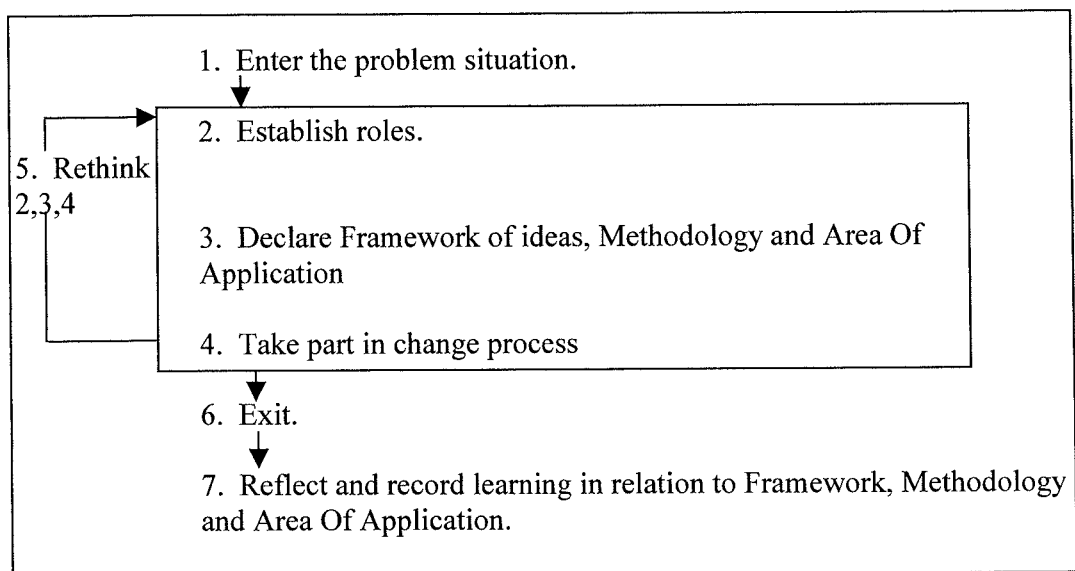


Figure 5.5  
*A Process for Action Research*  
 Source: Checkland (1991 P402)

Figure 5.5 displays the process that needs to be acknowledged when using SSM<sup>XL</sup>, as developed in this study. Checkland and Scholes (1990), in Chapter Ten of their book, discuss the process of Figure 5.5 relating to different modes of using SSM.

Checkland and Scholes (1990) argue that it is not useful to use either a pure mode 1 approach, where a group of individuals work through the stages of the methodology, or mode 2, where individuals use SSM as a way to think about problem situations. Checkland and Scholes (1990) argue that Figure 5.5 contains elements of both mode 1

and 2 perspectives. This was the case with this research. The SSM<sup>XL</sup> framework is the framework declared and the methodology is one of participatory action research incorporating co-operative inquiry that allows the use of SSM<sup>XL</sup>. The methodology and SSM<sup>XL</sup> attempts to make sense of everybody's actions within BreathCo and HealthCo, as well as allow learning about the process. This is important, as West and Stansfield (2001) argue that researchers who declare their framework early in a study will be restricted by the very framework designed to help. While it may be regarded that the framework of ideas was declared early, these were not fixed. This was because how the ideas were seen to work in practice was important, as well as the learning generated from each case, and the overall reflections that were made. The action research strategy adopted for this study is argued to have been declared.

The conceptual foundation aspect of Table 5.1 has been elaborated on in the introduction and literature review. The perspective/tradition and stream of action research has been stated in this chapter, and information on the issues of the study design was briefly displayed in Table 5.4. Sources of data have been stated for this study and will now be justified, as well as descriptions given of how the data will be analysed. The remaining issues are dealt with in the analysis chapters of this thesis.

### **5.5 The Data Collection Methods**

Kemmis and Wilkinson's (1998) perspective is that in order for action research to be used, the methods and approaches which offer a variety of techniques have to be considered. As Maxwell (2002) points out, a method can be valid in one instance but invalid in another. Validity does not relate to the method selected but is related to the data collected – the interpretation as well as the conclusions presented from use of the method (Maxwell, 2002). A problem with undertaking projects where collaboration is needed can be summarised by Mathiassen (2002), and relates the need to combine different approaches to draw out the differing goals and opinions present. Throughout the literature, it has been noted that in research focusing upon the learning perspective, thinking processes, and emotions of participants, use is made of interviews, focus groups and observations (Yeo, 2002). Whilst in contrast, research into learning at the level of the organisation uses questionnaires and surveys (Yeo, 2002). Using this perspective, data collection methods should utilise the interview and observation methods in order to collect data relating to the individual. It is

important that the data collection techniques allow the research question to be answered, as well as be commensurate with the methodology selected. It was important to decide what the data collection methods would involve, and how the data was going to be analysed and presented (Baraldi and Bocconcelli, 2001). In undertaking this, Strauss and Corbin (1998) argue that questions need to be asked, as well as comparisons made. Data collection methods which undertake such tasks therefore need to be used.

Mumford (2001) considers that, resources permitting, a number of different data collection methods should be used. A combination of methods allows a variety of perspectives to be drawn out, which confirms or refutes issues (Mumford, 2001). In response to this suggestion, a variety of methods have been used for this research. The purpose of using a number of methods was firstly, to search for what Mumford (2001) stated as allowing different perspectives to be drawn out. Secondly, the methods will be used to draw out aspects of SSM<sup>XL</sup>. As well as selecting suitable data for this research, doing this also provides what Stowell and West (1994) describe as a 'tool-box' of approaches that can be used in helping to design and implement an ISA. Whilst not all the methods discussed below were used in both BreathCo and HealthCo, those listed are:

- Participant Observation
- Interviews
- The Appreciative Inquiry Method's Venn diagrams
- Videos
- Questionnaires

To try and put the methods used throughout the research into context, Figure 5.6 is used.

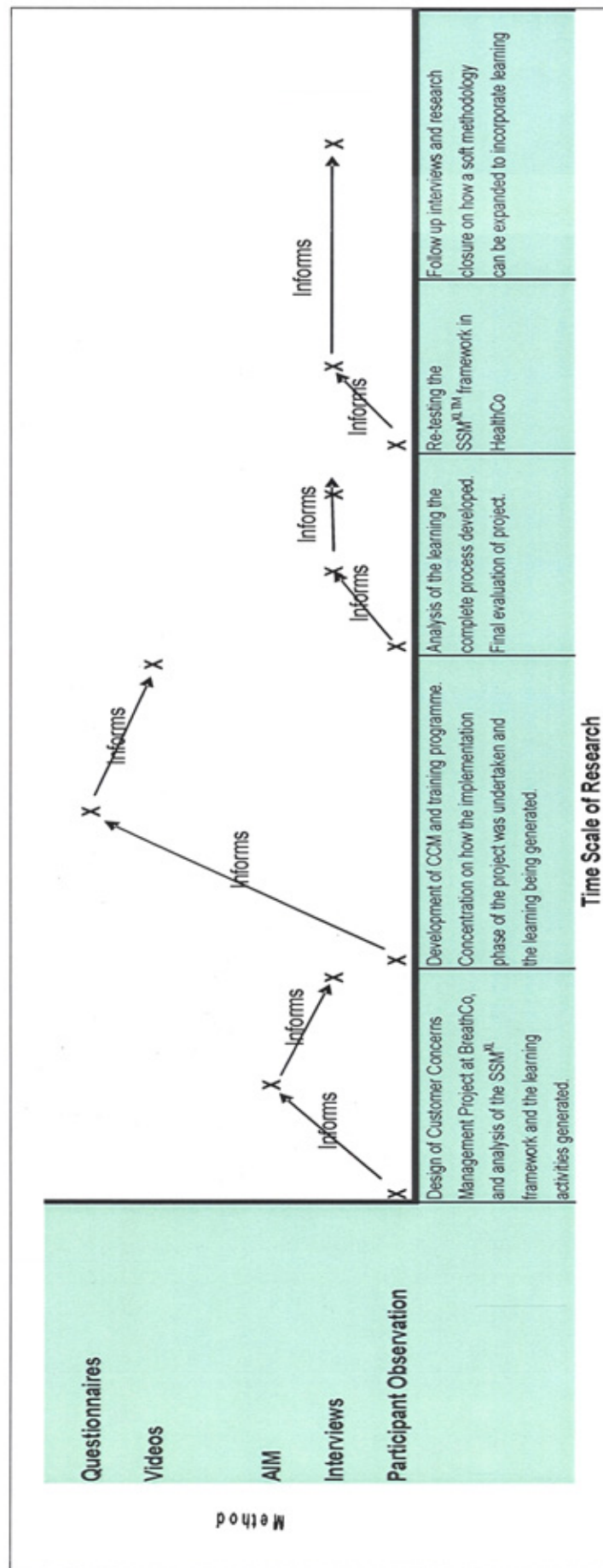


Figure 5.6  
The Research Methods Used and Their Relationship throughout the Duration of the Projects

### 5.5.1 Participant Observation

As Bogdewic (1999) states, the process of participant observation has been developed from the area of social and cultural anthropology. Angrosino and Mays de Pérez (2003) add that social scientists should state the activities being undertaken as well as when the activity is taking place. Vinten (1994) continues by adding that participant observation, when associated with social sciences, requires the researcher to enter into the group that is under investigation. This is in contrast to the deductive approach, as the researcher attempts to collect more data than they would collect using other methods from the outside of the organisation (Vinten, 1994). This was the aim of using participant observations within BreathCo and HealthCo. Participant observation has been noted to maintain its scope and rigour when connected to an action research strategy (Vinten, 1994). As the action research strategy is not a covert method, there is plenty of opportunity to record events observed as they happen. Vinten (1994) supports this, but adds that another person may not easily evaluate the appropriateness of the data collected. Participant observation, however, does not only relate to immersing with the culture, but also being able to step back from the immersions and write about what has been recorded (Bernard, 2000). It was important to plan how the observations would take place and be recorded. Bogdewic (1999) agrees, as he argues that participant observation is a suitable method if it assists answering the research question.

Participant observation was used as a starting point in both cases. Examining what participants did, how they worked, and how communication channels worked allowed issues to be recorded that represented what Checkland and Scholes (1990) discuss as the cultural stream of SSM. This could be argued as relating to Bernard's (2000) second role of 'participant observer'. By recording aspects seen around them, rather than being a complete participant or complete observer, Vinten (1994) supports making observations at regular intervals to build up a better picture of the activity being undertaken. To achieve this, observations were recorded in a diary (Zuber-Skerritt, 2002) and were used as part of the analysis. The observations were recorded each day when within the organisations, and re-written at the end of each day, as a form of reflection. Observations were recorded in the manner that Bogdewic (1999 p55) and Strauss and Corbin (1998) suggest and included

- who is present,
- what is happening,
- when does the activity occur,
- where is this happening,
- why is this happening,
- and how is this activity organised?

Whilst this process provided a structure, not all of these questions were answered for every observation recorded. To accompany this structure, the territory was mapped as suggested by Bogdewic (1999) and Aita and McIlvain (1999), and office layouts were recorded as well as aspects of the organisation diagrammed (e.g., organisational structure). Recording and seeing these cultural issues allowed the researcher to be aware of cultures in both BreathCo and HealthCo. The observations incorporated what Bogdewic (1999) states as an unobtrusive approach, where more observation was undertaken before participation in each project.

#### 5.5.2 Interviews

The use of an interview holds both advantages and disadvantages (Bryman, 1989).

The interviews conducted as part of this research can be classed as what Gilchrist and Williams (1999), as well as Bernard (2000) consider as key informant interviews, and what Miller and Crabtree (1999a) states as depth interviewing. Gilchrist and Williams (1999) state that key informant interviews help with understanding differences in cultures and histories of an organisation. Gilchrist and Williams (1999 p73) describe key informants as “...*key to the researchers understanding of the culture. They differ from other informants by the nature of their position in a culture, their information rich connection to the research topic, and by their relationship to the researcher.*”

Key informants within the BreathCo case represented the quality manager, the product performance manager, the customer services manager, and the second customer services team leader. At HealthCo, the key informants were the information manager, the workforce-planning manager, and the IT security manager.

Participants were identified as key informants in both cases, as they all possessed what Gilchrist and Williams (1999) describe as knowledge and status. Also, these



individuals were important to the projects that were undertaken. The key informants provided information through the interviews, but also provided information through e-mail communications, communications on site, and provided documents considered useful (cf. Gilchrist and Williams, 1999). It may be argued that due to the methodology presented, all interviewees would be key informants. Whilst this is true to an extent, the participants listed as key informants also were more senior within their organisations. This may then add to the debate that PAR and CI cannot be maintained. In defence, both organisations called for participation, but required certain individuals to oversee that projects were completed and were also required to keep more senior individuals informed of progress. The key informants therefore were the participants charged with such a role. Key informants are argued by Gilchrist and Williams (1999) to be selected purposefully. The participants selected as key informants were those participants who were not only senior participants but also were important to the projects.

While the above individuals were key informants, a number of other interviews were conducted through both cases. Miller and Crabtree (1999a p89) state that *“the interview is a research – gathering approach that seeks to create a listening space where meaning is constructed through an interchange/co-creation of verbal viewpoints in the interest of scientific knowing.”* One concern with interviewing participants relates to making the interview too structured, and taking away the chance for participants to have a voice in the research (Bernard, 2000; Miller and Crabtree, 1999a). As an answer to this problem, interviews are regarded to be either unstructured, semi-structured, or structured (Bernard, 2000; Nandhakumar and Jones, 1997). It is argued that more structured interviews would not give participants the voice that Miller and Crabtree (1999a) mention. The interviews adopted related to semi-structured interviews. Constructing the interviews as semi-structured allowed the generation of themes which sought answers and at the same time allowed what Bernard (2000) described as letting the participants lead the interview. Whilst questions were asked, participants were allowed to speak as much as was necessary. If participants were unsure of what to say or were confused, a number of probes (e.g., the silent probe, the echo probe) as stated by Bernard (2000) were used. Miller and Crabtree (1999a), whilst not giving a definitive guide to interviewing, believe when using interviews they need to be well designed, selecting a suitable way to sample

participants, designing a guide for conducting the interview, tackling issues relating to consent and confidentiality.

The interviews were designed with two purposes. Firstly, interviews were used as tools to help within the SSM<sup>XL</sup> framework, and secondly, interviews were used to capture the processes that were undertaken as part of each project. The sampling process for the interviews was constructed with key informants. Issues of confidentiality and anonymity were discussed with all participants beforehand, with a clear understanding that they did not have to speak or give an interview (cf. Bernard, 2000). It could be argued that this may not relate to CI. However, co-researchers and co-subjects need to collect data from participants who are not part of the research within each organisation, but who can contribute. Other participants therefore could be interviewed, and hence offer another voice to the research. All participants were offered the choice to opt out of having their interview recorded, with no participants in either organisation opting for this.

Using the advice of Bernard (2000) tapes were rewound a couple of times before being recoded on as well as testing the Dictaphone before use and carrying spare batteries to every interview.

While the interviews for the BreathCo case were semi-structured, and piloted on key informants, the interviews with participants of HealthCo were more unstructured, as they related to learning what each participant's role was with starters and leavers. As interviews can be difficult, strategies suggested by Miller and Crabtree (1999a Chapter Five) were taken note. The interviews were triangulated with issues recorded through participant observations. All interviews were fed back to participants for comments, as well as a form of validity checking to comply with ethics (cf. Gilchrist and Williams, 1999). The main data collected from interviews related to written transcripts (Silverman, 2003), which were transcribed by hand, before being typed up on a word processor.

### **5.5.3 The Appreciative Inquiry Method**

Observations and interviews were used to gather data about the project from individuals' experiences, feelings, and issues. Other more practical tools are argued

to help collect data required for analysis on the processes undertaken, with a focus on the area of concern within each case. One such method is the appreciative inquiry method (AIM) (see West, 1995). West, Stansfield and Stowell (1994 p186) offer the definition of appreciation from Vickers (1965) as representing “...*a state of understanding which is bound to an individual's perception of the world, which itself is bounded by context and circumstance.*” Whilst West, Stansfield and Stowell (1994) agree the definition is one of value, they choose to replace the word ‘world’ with ‘domain’. Therefore, AIM is used to appreciate an ‘experts’ perspective of the domain through the use of models. The use of models when examining IS are argued for as being relevant. Stowell and West (1994) state that models can be used as a communications device with others, so that perspectives and other insight can be discussed. The appreciative inquiry method was used as a way to draw out tacit issues relating to participants’ experiences within the unstructured problem situations encountered. West, Stansfield and Stowell (1994) argue AIM provides a different perspective in response to the criticisms and problems which traditional methods of rationalised, explainable, and structured techniques have attracted in knowledge elicitation (KE) through using systems ideas.

While AIM has drawn on the work of Checkland (Checkland, 1993; Checkland and Scholes, 1990) and Vickers (1965); the approach is not the same as SSM, even though it does share similar systems models (West, 1995; West Stansfield and Stowell, 1994). These include developing CATWOE’s, forming root definitions and developing conceptual models. Soft Systems Methodology has been developed to bring about change, whilst AIM is used to draw out key issues within a situation thoughtfully (West, 1995; West, Stansfield and Stowell, 1994). The second difference takes account of AIM as helping to inquire into a systems approach for information systems requirements analysis. Soft Systems Methodology does not relate specifically to IS design, even though work has been conducted using the principles of SSM for this purpose (see Atkinson, 2000; Avison and Wood-Harper, 1990; Wilson, 1984). West, Stansfield and Stowell (1994) emphasise that AIM focuses upon helping an expert (an individual who has knowledge of the domain) to describe their perspective of the ‘domain’. From what the experts derive as the issue, models are then constructed that the experts can then use to discuss this issues further (West, Stansfield and Stowell, 1994). It is argued that this thinking is important and relevant

to the methodology stated in allowing participants to become co-researchers and co-subjects in the approach.

West (1995) describes AIM as having two phases. Firstly, a systems map is developed; and secondly, the maps developed are converted into activities reflecting purposeful action brought about by the transformation process (West, 1995). In order to do this, elements of CATWOE and root definitions are used before developing conceptual models (West, 1995). Finally, as has been stated, the conceptual model(s) developed is presented back to the participants as a form of check, to make sure the model is representational (West, 1995). The model can then be used as a discussion tool to bring about change (West, 1995; West, Stansfield and Stowell, 1994). West (1995) argues that AIM is an iterative process, as well as one that requires several processes using the systems maps. West (1995) uses aspects of CATWOE, root definitions and conceptual models in Aim's second phase, which is similar to SSM. The systems maps undertaken at the first phase are what were considered as valuable and they were focused upon in this research. West (1995) describes the systems map as where participants construct a picture on their understandings of an area of concern. This process takes the form of a Venn diagram (West, 1995). *"The map consists of a central 'bubble' (x) in which is written a concise statement of the domain of interest"* (West, 1995 p146). A pictorial representation of this process can be seen in Figure 5.7.

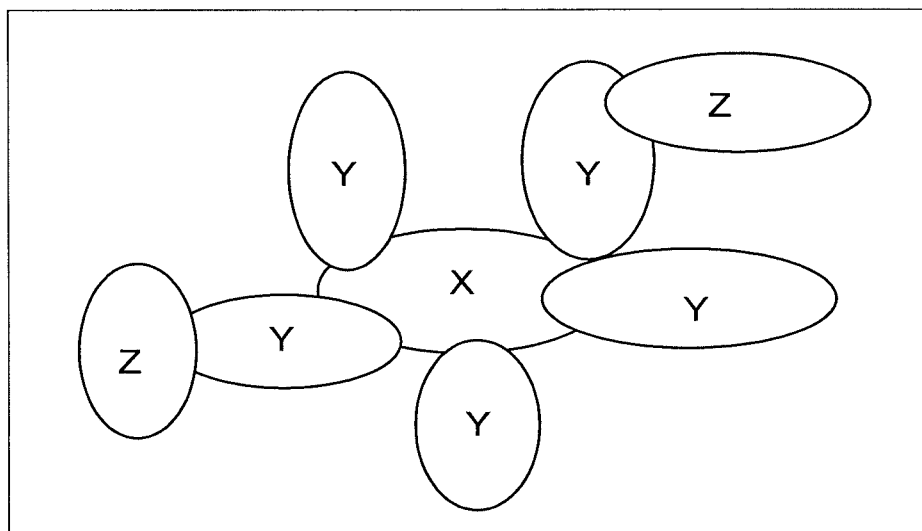


Figure 5.7  
*The Convention of the Systems Map*  
 Source: West (1995 P146)

West (1995) describes the main advantage of the systems map as the simplicity involved in undertaking the approach, as well as the little time required. Whilst West (1995) has developed AIM with three phases, it was only the first phase (the system map) that was used. It could be argued that the processes of AIM are used in the constructs of SSM in stage 3. In defence of this, the first phase of AIM for this research was used as a tool to draw out the tacit issues along with other methods such as rich pictures. West and Stowell (2000) go on to state that models such as rich pictures and AIM have to be compared to the philosophy they represent. This research acknowledges the work of constructivists as stated earlier, and models are argued to be interpretive, resulting in focus being placed “...*not on the model per se but on the modelling process, the modeller, and his or her reason for modelling*” (West and Stowell, 2000 p300). This is the focus which is placed on all aspects of models and modelling undertaken for this research. As Petheram (1997) proposes, a model is selected to try and represent the ‘real world’. The appropriateness of the model relates to how the selection was made (Petheram, 1997). While modelling may be taken as a skill that an individual may bring (e.g., constructing conceptual models), it is important that models constructed are not undertaken on a researchers’ perspective, but also incorporate participants of the research’s perspectives. This is another argument for the inclusion of participants in the research process and the methodology used.

Another advantage of the AIM process allows the analyst to construct CATWOE and root definitions on behalf of participants, away from the problem situation, to reduce the amount of time participants have to devote if they are busy (West, 1995; West, Stansfield and Stowell, 1994). West, Stansfield and Stowell (1994) continue by adding that the ‘elicitor’, by undertaking the root definition, may allow further questions and insights to be drawn. From this root definition the ‘elicitor’ can then construct conceptual models that are used by the participants to generate further discussions on the area under investigation. While it may be argued that this goes against a co-operative inquiry, participants have other duties within organisations, and did not have a large amount of time to devote to learning about the processes of CATWOE and root definitions. Presenting back what has been found can provide the debate and co-operative inquiry elements required, and not let a researcher control the research process, but place only their perspective on the models constructed.

#### 5.5.4 Videos

*“Conventional videotaping has become an important tool in non-diagnostic situations such as collecting data for analysis of interpersonal communication, providing the delivery vehicle for an intervention, or creating a permanent record for the evaluation of a program”* (Elderkin-Thompson and Waitzkin, 1999 p239). The purpose of using videotaping in this study was to capture the dialogue between a number of people speaking at once. This is what Elderkin-Thompson and Waitzkin (1999) state as the advantage of videoing, as well as recording non-verbal behaviour, which cannot be portrayed if recording using only audio. Whilst videotaping did not completely resolve the issue of competing voices, it allowed a picture to be presented of who was speaking to whom, and when. The purpose of using video was not to undertake the traditional content analysis (cf. Silverman, 2003) normally associated with video, as the analysis of the tapes specifically look to capture non-verbal behaviour. Videos were used as a way of trying to record aspects of social learning theory to see how learning was undertaken within organisations. Elderkin-Thompson and Waitzkin (1999) agree, as they used Bandura’s (1977) theory of a visual presentation for young patients. Whilst not exactly the same, it can be argued that videos can be used to try and help identify the learning theories adopted for this work. Videos were used only in the BreathCo case during the training, due to the HealthCo project being suspended just before a proposed plan to either video or audio record the debates about the best course of action. For the participants of BreathCo, permission was obtained from all participants (cf. Elderkin-Thompson and Waitzkin, 1999). As part of the participation, it was made clear that no other individual would see the videos. By sharing data, privacy could be violated; but by not sharing the data, the emphasis on co-operative inquiry would not be held. The project leaders were not interested in watching the video recordings, and therefore no problems were encountered. All videos recorded were transcribed in a similar manner to the audio recordings (cf. Elderkin-Thompson and Waitzkin, 1999) and provided what Silverman (2003) describes as written transcripts.

#### 5.5.5 Questionnaires

Bernard (2000) highlights the use of questionnaires as being similar to structured interviews, as they can incorporate similar processes (e.g., face to face, self-administered and telephone). A key difference, and advantage of using questionnaires

compared to methods such as interviews, relates to the analysis of the data being easier and quicker (Bernard, 2000). Questionnaires are a highly structured approach to data collection, aimed at large numbers of participants (Bryman, 1989). The questionnaires were designed to be what Bryman (1989 p41) considers '*standardised*', so that each participant answers the same questions in the same order. Along with this point, questionnaires are argued to remove the effects of the researcher that participants may encounter through methods such as interviews (Bernard, 2000). Questionnaires were developed to collect data on participants' perspectives in regard to customer concerns in general, participants' attitudes to the customer concerns technology, and participants' perceived benefits of the customer concerns technology. The questionnaires served as a measuring device to gauge participants' perceptions immediately after seeing the technology for the first time. Comparisons were to be made further to observations and interviews after the technology had been in use for a period of time. The researcher and members of BreathCo constructed the questionnaires administered. The data collected was stated to be valuable to both the research, and the overall project. A pilot of the questionnaire was tested on the project team, so that any limitations or confusion could be identified and amended before the participants reviewed the final draft (cf. Bryman, 1989).

The questionnaires were distributed to the participants immediately after the training, so they were what Bryman (1989 p41) describes as '*self-administered*'. The advantage of using questionnaires as opposed to interviews or other data collection methods related to the number of participants that could participate. Using a questionnaire, allowed data to be collected more quickly than conducting interviews (cf. Bryman, 1989). All participants were happy to fill in the questionnaire. The questionnaire was also anonymous, so no participant could be identified. The researcher was on hand to answer any questions that participants had with the questionnaire, and what particular questions meant. The questionnaires were designed on a four point Likert scale with 'strongly disagree', 'disagree', 'agree', and 'strongly agree' as the measurement of attitudes.

### 5.6 The Limitations of the Methods Selected

A minor limitation of this particular action research strategy may come from its strength. The amount of time the researcher spent with each organisation allowed him to build up a good idea of what was going on. It is plausible, however, to suggest that he cannot know everything (Mumford, 2001). Secondly, it is important to note that individuals already possess skills, opinions, values and life experiences (Zuber-Skerritt and Farquhar, 2002) that may not be easily challenged or changed. It is important that these issues are kept in mind when analysing the data (cf. Coughlan and Coughlan, 2002). Participants may have resented the research, and in turn provided misleading data. The methodology has attempted to remove this limitation, even though some participants may still not agree with the research.

Avison, Baskerville and Myers, (2001) perceive one of the main limitations of action research comes from the *double challenge*. The double challenge refers to the challenge of combining both action and research (Avison, Baskerville and Myers, 2001; Baskerville and Wood-Harper, 1996; Kock, 1997). Due to the framework created (in this chapter), it was argued that this problem has been overcome through the clarity that has been presented through this methodology. The method of action research may not have allowed the generation of new knowledge (Avison, Baskerville and Myers, 2001) within the area of learning and information systems. Through the data collected and the model produced this limitation was also avoided.

A criticism of participant observation comes from the validity of the data collected. If the researcher is interacting with the subject under investigation, the presence of the researcher may alter the nature of what is being observed (Vinten, 1994). As an action research strategy is being undertaken, the main purpose is to change an aspect of the organisation. A problem could have occurred within the observation, with the subject altering the way they behaved for the observers' benefit. It was thought that the research strategy developed reduced this likelihood, as well as using the unobtrusive approach suggested by Bogdewic (1999). The individuals were responsible for analysing the data recorded of themselves, and for causing the desired change. The motivation, therefore, of individuals altering their behaviour for the purpose of the observer had been removed. As the participant observations were linked to action research, the reason for undertaking covert observations was



removed. Another disadvantage of observations is highlighted as being that what is observed can relate to who the observer actually is (Angrosino and Mays de Pérez, 2003). Researchers who are a different gender and age, for example, could record a different process, and from this, draw different observations (Angrosino and Mays de Pérez, 2003). Whilst this limitation cannot fully be resolved, other data collection methods were used to try and reduce such a problem. One final disadvantage of participant observation is the length of time required (Bogdewic, 1999). Due to the nature of the project there were plenty of observations made throughout the BreathCo case. Whilst the HealthCo case was not as long as the BreathCo case, it still provided enough instances where observations could be made.

Whilst both key informant and depth interviews were conducted, Gilchrist and Williams (1999) highlights the potential problems that using key informants could cause. For example, identifying and using key informants may require a comparison between rigour and feasibility, while not invalidating data collected could become a source of bias. This point was kept in mind throughout the analysis. While the key informants provided valuable data, it was cross-checked (where possible) with other interviewees, as well as observations recorded or other data that could be used for triangulation purposes. Triangulation attempts to capture an understanding of what is under investigation, as has been argued through the epistemology and theoretical perspective, as one reality cannot be identified (Denzin and Lincoln, 2003). Gilchrist and Williams (1999) go on to discuss how informants can be guided by particular questions, and will not elaborate on key issues that are important. In order to tackle this issue, all interviews were designed as semi-structured with enough leeway for other issues to be explored, and questions were designed openly so participants could talk freely. The methodology designed also tried to reduce this problem by having co-researcher and co-subjects. The data collected therefore is important and needs to be accurate. By using key informants represented a number of different departments in both cases. Using key informants and other participants from a heterogeneous sample, bias is reduced (cf. Gilchrist and Williams, 1999).

While using videos provided advantages to the research, as discussed within the videoing methods section, they can also provide limitations. Elderkin-Thompson and Waitzkin's (1999) state that videoing can effect the communication between

participants, as they may be put off. Attending the videoing sessions did not seem to be an issue for the participants of BreathCo. All participants had the option of not being videoed to reduce the possibility of this problem. If one participant objected, the whole session would not be videoed and this happened on only one occasion. The only limitation of the videos came from triangulation. Unlike an audio recording, the videos had to be watched on a video player, and it proved difficult to rewind a split second when transcribing dialogue. This may have resulted in the transcriptions not being as accurate as the audio transcriptions even though care was taken to be as accurate as possible. The final point examines the use of videoing as a researcher led process, which goes against the methodology stated. While this is true, it was discussed with the co-researchers: Though they could not find any value in not videoing the sessions but decided what could be summarised from the training could be fed back.

The main disadvantages of questionnaires can be stated as lack of clarity in the method (Bryman, 1989), as well as lack of control over participant's interpretations of questions (Bernard, 2000). The researcher remained on hand to answer any such questions so it is argued that this limitation was reduced. All participants filled in a questionnaire after training, which allowed the right participants to receive the questionnaire. This is a limitation highlighted by Bernard (2000). Bryman (1989) also adds that a major limitation of questionnaires can be the low response rates achieved. Again, as the researcher was present at the training, all participants who were trained received a questionnaire and completed it, resulting in a high response rate.

From the methods presented, both advantages and limitations have been discussed. While it is necessary to identify any biases and limitations recorded, it is argued that an attempt has been made to acknowledge and overcome these. Through using a variety of methods, it can be argued that the data collected for this research was suitable. As a summary, Table 5.7 has been constructed to show what methods were used in each case.








Method	BreathCo	HealthCo
Participant Observations		
Interviews		
The Appreciative Inquiry Method		
Videos		
Questionnaires		

Table 5.7

*The Research Methods used in BreathCo and HealthCo*

### 5.7 Data Analysis and Presentation Methods

The methods that were used to collect the data have been discussed, as well as the limitations of these methods. While an attempt has been made to overcome the limitations through using a variety of different methods, the data collected needed to be analysed, and presented. Miller and Crabtree (1999b p128) state that *“interpretation is a complex and dynamic craft, with as much creative artistry as technical exactitude, and it requires an abundance of patient plodding, fortitude, and discipline.”* While Strauss and Corbin (1998) add that this skill can be learnt, Bernard (2000 p419) states that *“analysis is the search for patterns in data and for ideas that help explain why those patterns are there in the first place, the way I see it, analysis is ultimately all qualitative.”* Analysing data collected is very important, but as Miller and Crabtree (1999b) and Bernard (2000) imply, the process relates to interpretation and explanation. How this process will be undertaken and presented is important.

The data has been collected through a co-operative process with co-researchers. Deciding what data to collect is a co-researcher judgement, with co-researchers and co-subjects having to interpret the outcomes, which is due to the constructivist perspective argued for. It is the researcher however, who has to interpret the data for presentation in this thesis. One problem is all the data collected is an interpretation constructed that could be interpreted differently by a different researcher (Miller and Crabtree, 1999b). In order to help analyse and present suitable data, Miller and Crabtree (1999b) argue that five iterative phases that can be undertaken. These phases include describing, organising, connecting, corroborating/legitimizing, and

representing the account (Miller and Crabtree, 1999b, c). A brief summary of each of the phases will now be reviewed, with an explanation of how they related to the work.

Describing can be considered as a reflexive process where what was thought could come out of the research, and what actually did, is compared (Miller and Crabtree, 1999b). This process was constant throughout the research process, and not just undertaken during the writing up and main analysis of the data. This was also undertaken, whilst not formally written up, with the co-researchers. Undertaking describing processes helps with the decision making process, and identifying what is important and what needs to be considered within the analysis (Miller and Crabtree, 1999b).

Miller and Crabtree (1999c) state that the organising phase as a process of entering the data collected, and re-organising it to answer the research questions posed. In order to do this effectively, Miller and Crabtree (1999c) propose three strategies namely, template, editing and immersion/crystallisation. The strategy adopted for this study was one of immersion/crystallisation (I/C). The template strategy aims to develop a template or codebook before collecting the data, revising what data was collected and corroborating/legitimizing the data (cf. Miller and Crabtree, 1999c). This is argued as a more positivist stance to doing qualitative work. While it is useful, it is argued that it is unsuitable in answering the research question and aims of this research. Using a strategy of editing requires the development of categories, which are revised and sorted before connecting with the data and corroborating/legitimizing (cf. Miller and Crabtree, 1999c). This is also acknowledged as useful, but can be argued to be very structured in conducting research. The perspective of the immersion/crystallisation strategy is one of the reflective participant (Miller and Crabtree, 1999c).

Borkan (1999) states that the process of I/C is part of qualitative research and corresponds with other techniques such as heuristics, hermeneutics, and phenomenology. It could be argued that I/C is considered similar to grounded theory (see Strauss and Corbin, 1998) as categories were identified emerging from the data, and linking the concepts where appropriate (Bernard, 2000). Whilst the process is similar, I/C is the process used. The problem of undertaking an I/C approach relates

to enlightening the reader to this process. Borkan (1999) agrees, when he states that writings using this approach leave the secrets of the approach unspoken. While Borkan (1999) continues by implying the approach as being similar to artistic expression that cannot easily be explained, this research has to make an attempt to do so. A strategy of I/C can be described as using “...*more of the researcher, often requiring cognitive and emotional engagement of the self to get beyond the obvious interpretations to hear, see, and feel the data*” (Borkan, 1999 p180). The main requirements in undertaking I/C relates to one’s self, being open to uncertainty and reflection, as well as relying on experience (Borkan, 1999). It may be argued that this experience is lacking. If a process of I/C has to rely on data, personality, time and patience, reflexivity, process orientation and a mentor (Borkan, 1999), the final issue has been dealt with through the supervision team. It is proposed that all three supervisors have experience in analysing data in this way and helped question and guide the data analysis process. It can be argued that the data was obtained through the methods discussed as well as possessing patience, and time was spent with the data covering aspects required to undertake a process of I/C.

To aid in the undertaking of I/C, Borkan (1999 p183) lists seven iterative processes, namely

- initial engagement with the topic
- describing
- crystallisation during data collection
- immersion and illumination of emergent insights from the collected data
- explanation and creative synthesis
- corroboration/legitimizing
- reporting the account.

These issues repeat what Miller and Crabtree (1999c) have listed with interpretation of data. It can be stated that the I/C process focuses on crystallisation/immersion and illumination and explanation. The interpretation approach incorporating a strategy of I/C can be adapted from Miller and Crabtree (1999c) and is shown in Figure 5.8 below.

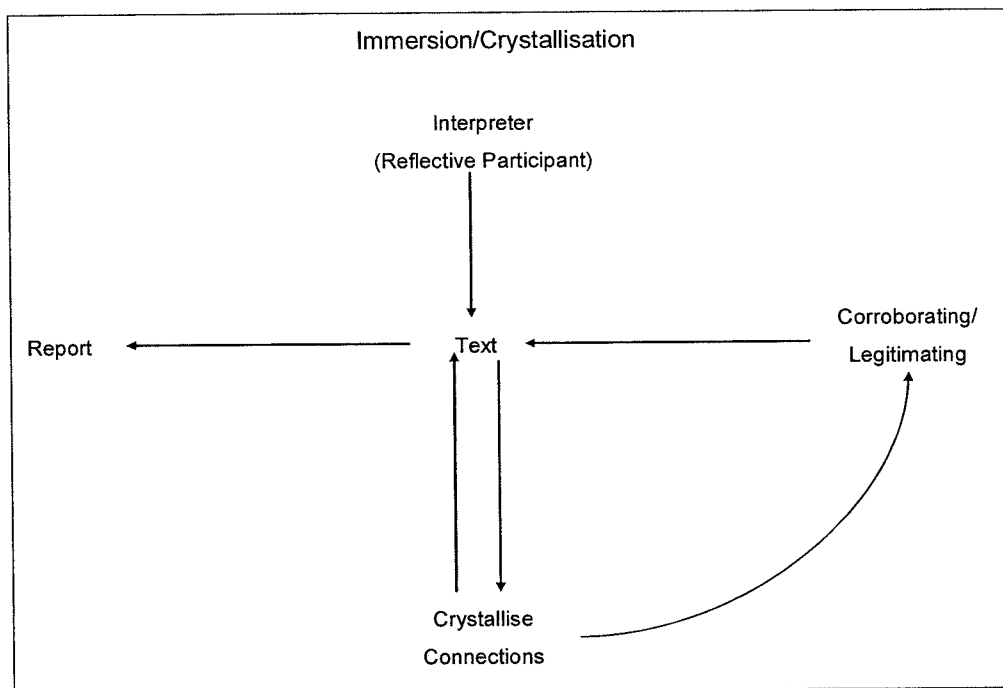


Figure 5.8

*A Pictorial Representation of an Immersion/Crystallisation Approach*

Source: Miller and Crabtree (1999c P22)

Borkan (1999) considers crystallisation to occur at all stages of data collection even during the early stages. Borkan (1999) offers help by elaborating that after interviews have been conducted, a sheet is created for recording insights. While not using exactly the same strategy, insights were recorded separately and written up in the diary with other observations. These insights were then discussed with the supervisory team as a process of clarification and interpretation of what was considered to have transpired. While such processes were undertaken during the actual data collection, immersion in such data occurred in private with the outcomes being verbally communicated with the co-researchers/participants in the organisations. Borkan (1999) discusses such techniques for this aspect, and while on a similar theme, the researcher adopted his own approach. Borkan (1999) starts by reviewing the data collected.

As has been stated in the methods section, all data was converted to written text form. Using the tools developed by Miles and Huberman (1984, 1994) contact summary sheets were developed for interviews and videos, as well as document summary sheets for documents collected throughout this research. An example of a contact summary sheet used for an interview and a document summary form can be seen in Appendix

D. These forms were filled in at the time of the interview or where the videos were being recorded, and these were later re-typed on a computer. This acted as a reflective process. As previously explained all interview and video data was transcribed firstly by hand, and then typed up on a computer, allowing second reflective insights to occur. Finally, all recordings were played back to check for consistency and accuracy of the transcriptions and to check the summaries written were also accurate (cf. Bernard, 2000; Miles and Huberman, 1994). Undertaking such a process allowed memories to be jogged, as well as taking the researcher back to the time of the interview. The data was managed by obtaining a folder for each case with dividers created to separate each participant's data (cf. Miles and Huberman, 1994). With each case, all data including contact summary sheets, AIM sheets, and notes taken at interviews were included in that participant's section of the folder. All documents collected were placed at the front of each folder with document summary sheets.

Once the data had been transcribed, they were sent to the relevant participants to get their reflections and comments. Undertaking this process could be regarded as what Borkan (1999 p186) states, as a '*horizontal pass*'. A horizontal pass requires the reading of text from beginning to end allowing evidence to present itself, as well as different perspectives. Once all data was examined, the cycle was undertaken another two or three times with new insights and issues taken account of and identified. It is argued that this added to the I/C that occurred. These aspects represent what Miller and Crabtree (1996b) propose as organising, connecting, and corroborating/legitimizing the data. While these processes were undertaken, they did not occur immediately and time was required to be spent with the data. This could be considered as what Borkan (1999) highlights as not forcing or coercing the data. As a full time researcher, this problem was avoided

While a strategy of immersion/crystallisation was used to interpret the data, data management was helped using ATLAS.ti. ATLAS.ti is a qualitative computer software package. Meadows and Dodendorf (1999 p195) state, "*interpretation, even with computer assistance, is a personal experience.*" ATLAS.ti was used to help with data organisation and moving between transcripts. This is important as Miles and Huberman (1994) state that how data can be managed is directly related to the

analysis that can be performed. Whilst software can help with this management, Meadows and Dodendorf (1999) highlight the resistance that has been placed on qualitative software packages. This is argued as coming from the removal of the researcher from the data, and turning the process into a quantitative experience (Meadows and Dodendorf, 1999). Meadows and Dodendorf (1999) continue by adding that software cannot allow suitable interpretations to be made. These interpretations have to be drawn by the researcher, and it can be difficult to close the research off (Meadows and Dodendorf, 1999).

ATLAS.ti was the software used for this study, as licenses were available from the university for this qualitative package. It could be argued that using this package may be a bias, as others may be more suitable. The counter-argument to this is that as long as software helps with storage and retrieval of data, as well as reading the data and allowing codes to be formed (Bernard, 2000; Guidry, 2002; Meadows and Dodendorf, 1999) it is suitable. Miles and Huberman (1994) support this thinking, especially when they argue that novice researchers could become vulnerable to bad data management.

ATLAS.ti was used to help reduce this problem and undertake the strategy of immersion/crystallisation. As Meadows and Dodendorf (1999 p199) state, “*research teams that decide to use immersion/crystallisation as the primary organising style need to be close to the data to be able to work from the derived text in developing coding.*” This was why ATLAS.ti was used in this study. The researcher will be undertaking the interpretation of the data, so the software is used as an aid in undertaking the interpretations for the researcher (cf. Guidry, 2002; Meadows and Dodendorf, 1999; Weitzman, 2003). As Weitzman (2003) points out, only a researcher can know what needs to be analysed and presented, with the software being used to help. In conclusion, Meadows and Dodendorf (1999) argue that using software such as ATLAS.ti enhances qualitative research through savings in time, allowing data to be presented more clearly; allowing coding to be undertaken, and allowing a researcher to see what the collected data reveals.

Miller and Crabtree (1999b) state that the processes of organising, connecting and corroborating/legitimizing as iterative. ATLAS.ti was particularly useful for this



purpose. On using an organising approach, connecting the issues begins (Miller and Crabtree, 1999b). For this research, connecting took form through what Miller and Crabtree (1999b) state as engagement and reflection with the data collected through processes such as immersion/crystallisation, explained above. From ‘connecting’ with the data, themes and patterns were identified, with follow up themes being generated (cf. Miller and Crabtree, 1999b). Tools such as networks, diagrams, and tables were found particularly useful, aided through ATLAS.ti for presenting the data (cf. Miller and Crabtree, 1999b; Strauss and Corbin, 1998).

From organising and collecting comes corroborating/legitimizing. Miller and Crabtree (1999b) also regard this stage as uncovering and highlighting what issues relate to allow confirmation to be undertaken. From the data collected, inquiries were undertaken to capture the many voices and issues raised, and to confirm the interpretations drawn (Miller and Crabtree, 1999b). Strategies for this can include seeking other explanations, evidence that provides other interpretations, negative cases and checking issues with participants (Miller and Crabtree, 1999b; Strauss and Corbin, 1998). This research used a variety of these techniques, from feeding back data collected for participants to comment on, to drawing out evidence that may be different to what participants were stating, and using observations to check for consistency and other explanations. The findings came from immersion/crystallisation with the data (cf. Borkan, 1999). These issues, however, need to be communicated.

Miles and Huberman (1984, 1994) have written a very useful book for undertaking qualitative analysis. Whilst they describe and present useful tools and techniques, it is argued that their book sets out an approach comparable to a quantitative study, where descriptions and answering hypothesis is undertaken. While such an approach for a qualitative study can be used, and is useful, this was not the case for this research. As has been stated, a strategy for such an approach may be best suited to a template analysis, for example, as suggested by Miller and Crabtree (1999c). While tools and approaches offered by Miles and Huberman (1994) have been used (e.g., contact summary sheets and document summary forms) other techniques were drawn on less. However, the detail and advice offered by Miles and Huberman (1994) was a great help. The most popular approaches used within this work included matrices and

networks (see Bernard, 2000; Miles and Huberman, 1984, 1994). Both matrices and networks were derived from using ATLAS.ti and were either presented in the forms of tables in Microsoft Word or in Excel, while networks were re-drawn in Microsoft Power Point. This issue needs to be elaborated upon.

The networks constructed were quite detailed composed of memos, codes, and participant's statements that immersed from the data. Such a display could be misleading to a reader. An example of such a network can be seen in Figure 5.9.

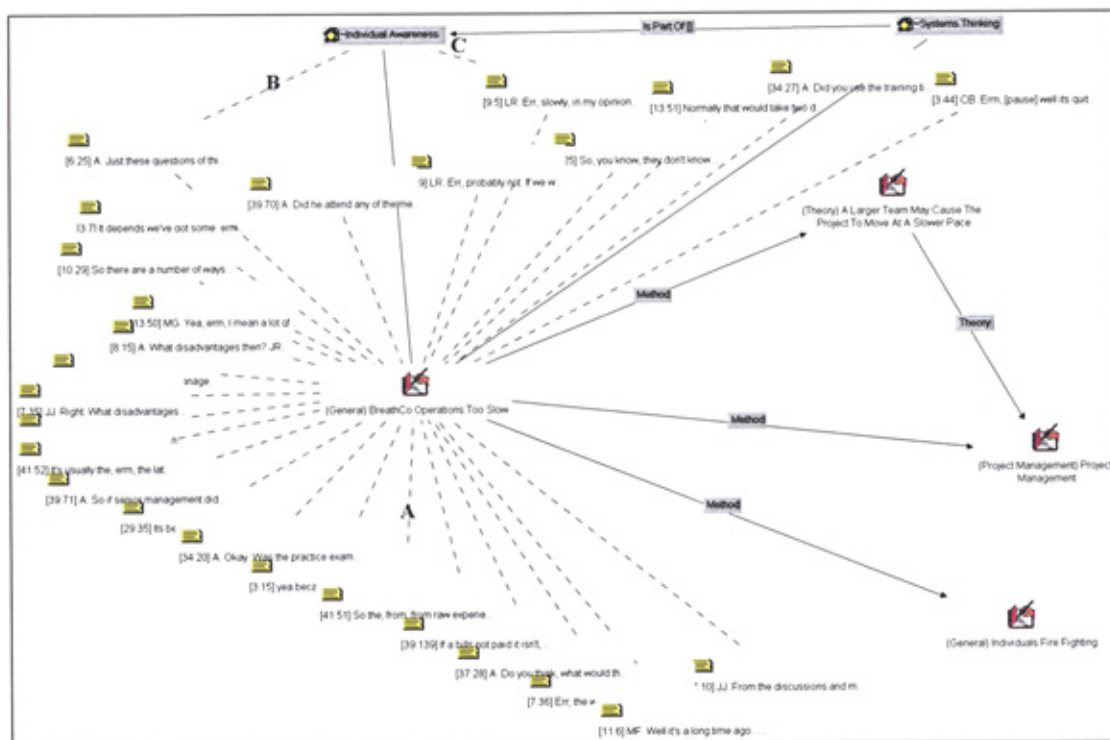


Figure 5.9

*An Example of a Network Used in this Research*

As Figure 5.9 shows, a lot of data is displayed. The letters (A, B, and C) corresponded to issues that participants were stating, or other points drawn out in the analysis. For example, letter 'A' is attached to a quote emphasising that the organisation either is perceived to work in two modes, slowly or should have been completed yesterday. This quote is attached to a memo (the organisations operations are too slow) to which a number of other quotes are also attached to in an attempt to support this thinking. The problem could be stated as that Figure 5.9 is too complex to understand. In an attempt to reduce the complexity of the networks and communicate the key points more effectively, each network has been re-constructed

and has been presented in Microsoft Power Point. An example of the same network displayed in Figure 5.9 is shown in Figure 5.10.

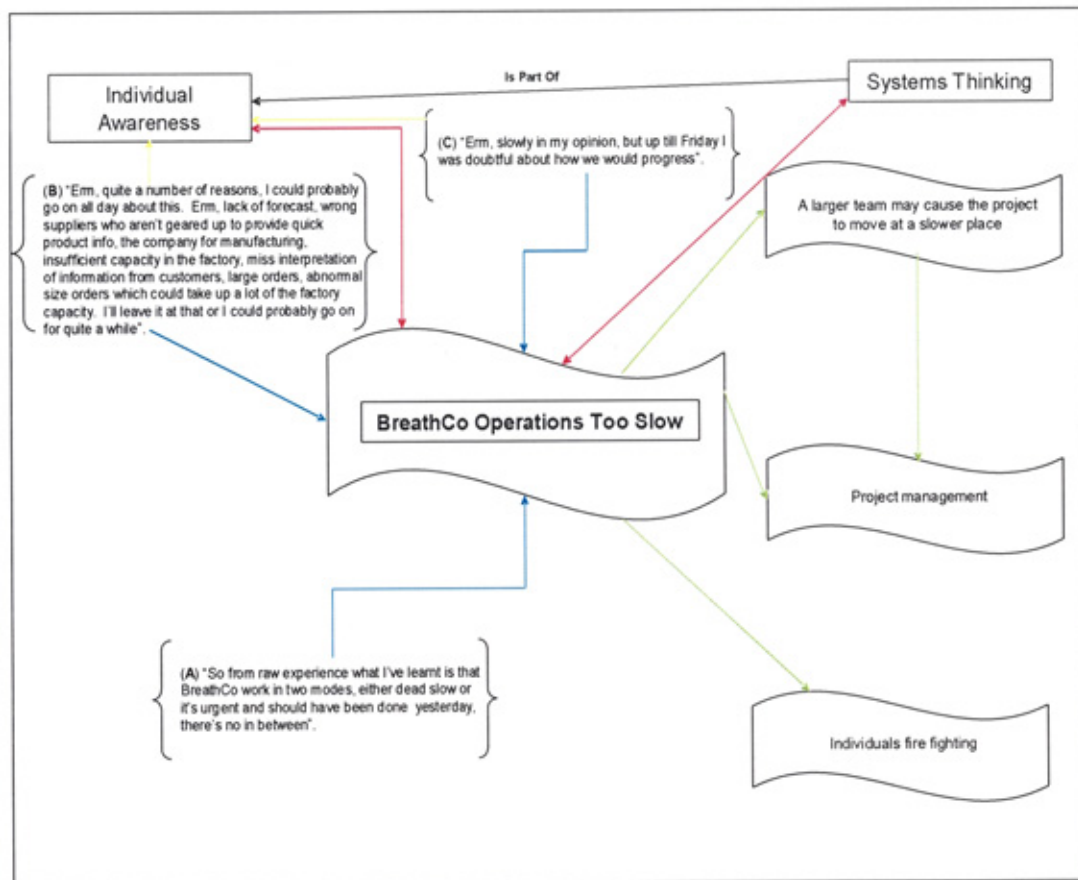


Figure 5.10  
*An Example of a Network Re-Created in Power Point*

Figure 5.10 displays the same aspects as Figure 5.9 but can be seen more clearly. All the original networks, as shown in Figure 5.9 has been placed in an appendix (Appendix E) so interested readers can see each complete network. The analysis sections will display the same networks as Appendix E, but in a similar manner to Figure 5.10. As a key to guide the reader in what each network is displaying, Figure 5.11 can be used.

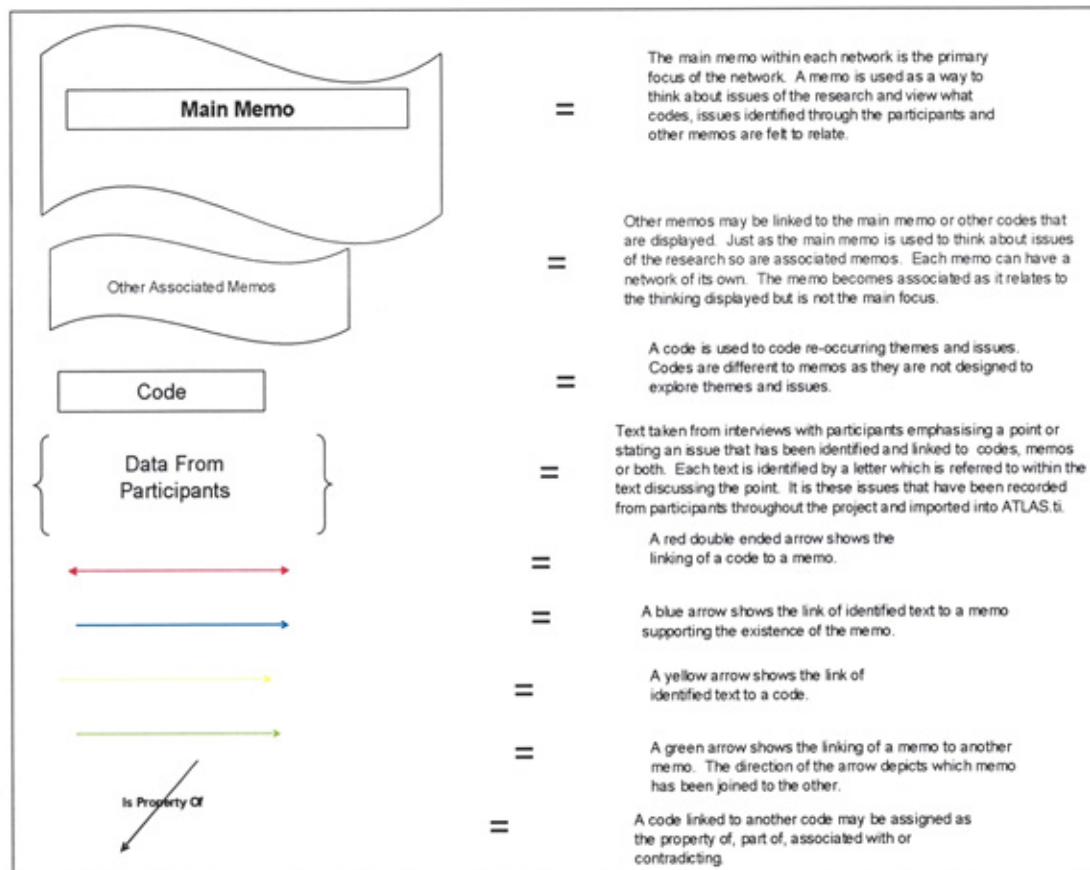


Figure 5.11

*The Legend to Understand the Re-Created Networks*

The final aspect of the interpretation iteration is that of representing what has been uncovered (Miller and Crabtree, 1999b). This account can be represented in different ways, depending on the audience (Miller and Crabtree, 1999b). As this research was conducted as part of a PhD research programme, the research has been presented with an academic audience in mind. Advice is given by Strauss and Corbin (1998 p25) when they state that through writing up the research an individual can develop “*a clear analytic story by sorting through the diagrams and memos, and then, (b) working out a main outline that will fully incorporate all important components of that story.*” While care has been made to represent the data in the best possible manner with help from a software package, it is up to the readers to judge this for themselves.

### 5.8 Summary

This chapter set out by exploring the traditional stance of following an inductive or deductive approach. This, however, was considered as being inadequate. So, through

Crotty (1998), an examination of the foundations of research was undertaken. An epistemology of constructionism, and a theoretical perspective of symbolic interactionism were stated. On declaring a methodology, action research was argued as suitable; however, a methodology combining participatory action research (PAR) and co-operative inquiry (CI) was laid out. From these issues, a framework developed by Lau (1999) was utilised which clearly declared the conceptual foundation of the research, as well as role expectations. A fuller description of the research process was undertaken to show how the cycles of action and learning were conducted. Finally, the methods selected to collect the data as well as their limitations, were discussed before declaring how the data collected was analysed and presented. Whilst these issues have been declared, the remainder of this thesis is dedicated to presenting the findings.

## Chapter Six: An Overview and Reflection on the Customer Complaints/Concerns Management Project at BreathCo

### 6.0 Introduction

An introduction was provided in Chapter Five through adapting Lau's (1999) unifying IS action research framework, as well as providing an overview of the research process, about the organisation and the project undertaken. This will again briefly be summarised here. Organisation one is a manufacturing organisation of gas detection and breathing apparatus, which is labelled as BreathCo (not the organisations real name). Contact had been made with individuals from this organisation from June 2002, but it was not until March 2003 that more formal contact was made with BreathCo. BreathCo initiated a research day (March 2003) that challenged employees to try and help the organisation change and adapt to the ever competitive business environment. This implied that employees could suggest and undertake improvements where necessary. As a result, it can be summarised that the management at BreathCo favoured conditions of participation and client led design, which are two of the methodological assumptions that have been stated. It was believed that a project could be identified within BreathCo, where the SSM<sup>XL</sup> framework could be used to see if a learning approach could be incorporated into a soft methodology, for the design and implementation of an information system application.

By providing this overview, and the number of justifications given in the detailed methodology (Chapter Five), the practical work can now be discussed with the accompanying analysis undertaken in the next chapter (Chapter Seven). This chapter is split into a number of sections, which correspond to the duration, of each specific stage of the project. Even though the stages did not always follow a linear path with some stages blurring into others, for the purpose of this review, each section will be discussed sequentially. Reference to any deviations from the SSM<sup>XL</sup> framework will be made clear and the reasons why stated. One final point to make clear is that in the early stages of the research, the project was called 'the customer complaints management project', before the project was renamed 'the customer concerns

management project'. In places therefore, the project is referred to as the customer complaints/concerns management (CCM) project.

### 6.1 The BreathCo Project Time Line

The duration of the BreathCo project can be charted through Figure 6.1. Figure 6.1 represents a complete pictorial time line of the customer complaints/concerns management (CCM) project, the activities undertaken, when, and which individuals provided data. It should be noted through Figure 6.1, that the project underwent a number of stages. Each stage of the project represents a section within this chapter. The first stage involved two weeks of observation where the organisation was entered and observations were made on the individuals at work. The second stage of Figure 6.1 shows the design of the CCM technology. This stage lasted for a total of five months. The third stage focused upon implementing the CCM technology using the outputs of stage two. This stage lasted for two months in order to test a prototype. The fourth stage was used to develop a training plan for use in training all appropriate employees, as well as further testing of the CCM prototype. This stage lasted for three months. The fifth stage involved the training of appropriate individuals who would then use the information system application (ISA). This stage lasted two months. The remaining two stages (six and seven) focused upon the post-implementation of the ISA. Stage six lasted for three months and consisted of an informal review of how the ISA was running and how it was being used. The final stage (stage seven) in agreement with the participants, was primarily the researcher's (even though the results were fed back to the design team) who conducted an evaluation of various issues relating to the project. These issues included how individuals found using the ISA, what plans the team have for the future use of the technology and, an interview with the organisations IT manager about how this and other technologies have an impact upon the individuals of the organisation. This stage lasted for two months. The purpose of this case was to explore how SSM<sup>XL</sup> would work in practice, and on completion of the framework how the learning activities designed would be used to generate the design and implementation of a suitable information system.



Month	Aug (2003)	Sep	Oct	Nov	Dec	Jan (2004)	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan (2005)
Stage Of Project	Two Week Observation	Design of CCM						Implementing the CCM Technology	Further Implementation and a Focus Upon a Training Programme			Training		Early Use			Evaluation	
Practical Work Undertaken and Data Collected	First perception of organisation. Diary of events recorded. Document Collection.	Aim sheet distributed and collected. Interviews started and completed (*13). Feedback of results was undertaken in November. Documentation collected included the system models constructed, meeting schedules, and other documents that were used to focus the construction of the models.						Early use of CCM technology. Diary of events recorded.	Training power point presentation and training manual constructed. Diary of events recorded.			Training undertaken. A post-training questionnaire was conducted along with videoing a number of training sessions. Diary of events recorded		Focus upon how the CCM was working. Early improvements that have been identified for the CCM technology. Diary of events recorded. Interviews (*2) conducted relating to the organisations improvement programme.			Interviews conducted with design team (*4) and individuals who use and are currently not using the technology (*10). The outcomes were fed back to the organisation. An interview conducted with IT manager relating to how IS are managed within the organisation.	
Employees Interviewed																		
Quality Manager (Project Leader) * Int: 1 + 37			<input checked="" type="checkbox"/>														<input checked="" type="checkbox"/>	
Repair Co-ordinator Int: 2			<input checked="" type="checkbox"/>															
Shipping Supervisor Int: 3 + 32			<input checked="" type="checkbox"/>															<input checked="" type="checkbox"/>
Receptionist Int: 4			<input checked="" type="checkbox"/>															
International Team Leader (Customer Services) Int: 5			<input checked="" type="checkbox"/>															
Product Planner Int: 6			<input checked="" type="checkbox"/>															



Month	Aug (2003)	Sep	Oct	Nov	Dec	Jan (2004)	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan (2005)		
Stage Of Project	Two Week Observation	Design of CCM						Implementing the CCM Technology		Further Implementation and a Focus Upon a Training Programme			Training			Early Use			Evaluation	
Customer Services Team Leader 1 (Instrument Specialist) Int: 7			<input checked="" type="checkbox"/>																	<input checked="" type="checkbox"/>
Repair Administrator Int: 8			<input checked="" type="checkbox"/>																	
Product Performance Manager (Quality Department) * Int: 9 + 25 + 38			<input checked="" type="checkbox"/>												<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>
Workshop Supervisor Int: 10			<input checked="" type="checkbox"/>																	
Credit Control Accountant Int: 11			<input checked="" type="checkbox"/>																	
Product Improvement Manager Int: 12			<input checked="" type="checkbox"/>																	
Customer Services Manager * Int: 13 + 39			<input checked="" type="checkbox"/>																<input checked="" type="checkbox"/>	
2 <sup>nd</sup> Customer Services Team Leader * Int: 26 + 40															<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	
Research and Design Employee Int: 27																		<input checked="" type="checkbox"/>		
Quality Managers PA Int: 28																		<input checked="" type="checkbox"/>		

Month	Aug (2003)	Sep	Oct	Nov	Dec	Jan (2004)	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan (2005)
Stage Of Project	Two Week Observation	Design of CCM						Implementing the CCM Technology	Further Implementation and a Focus Upon a Training Programme			Training			Early Use			Evaluation
Service Co-ordinator Int: 29																	<input checked="" type="checkbox"/>	
Service Co-ordinator 1 Int: 30																	<input checked="" type="checkbox"/>	+
Accountant Int: 31																	<input checked="" type="checkbox"/>	
Gas Detection Supervisor Int: 33																	<input checked="" type="checkbox"/>	
Customer Services Technical support Employee Int: 34																	<input checked="" type="checkbox"/>	
Quality Employee Int: 35																	<input checked="" type="checkbox"/>	
Purchasing Employee Int: 36																	<input checked="" type="checkbox"/>	
IT manager Int: 41																	<input checked="" type="checkbox"/>	

Figure 6.1

*A Time Line of the Customer Concerns Management Project***Key**

\* = Individuals who were primarily the project team leaders.

+ = The tape the interview was recorded on broke before transcription could be performed.

Int = Interview reference number referring to an individuals transcript within ATLAS.ti.

As an added reference, the SSM<sup>XL</sup> framework developed in Chapter Four can be seen (see Figure 6.2) with the activities undertaken at BreathCo (which also complements the timeline in Figure 6.1 above) grafted onto the framework.

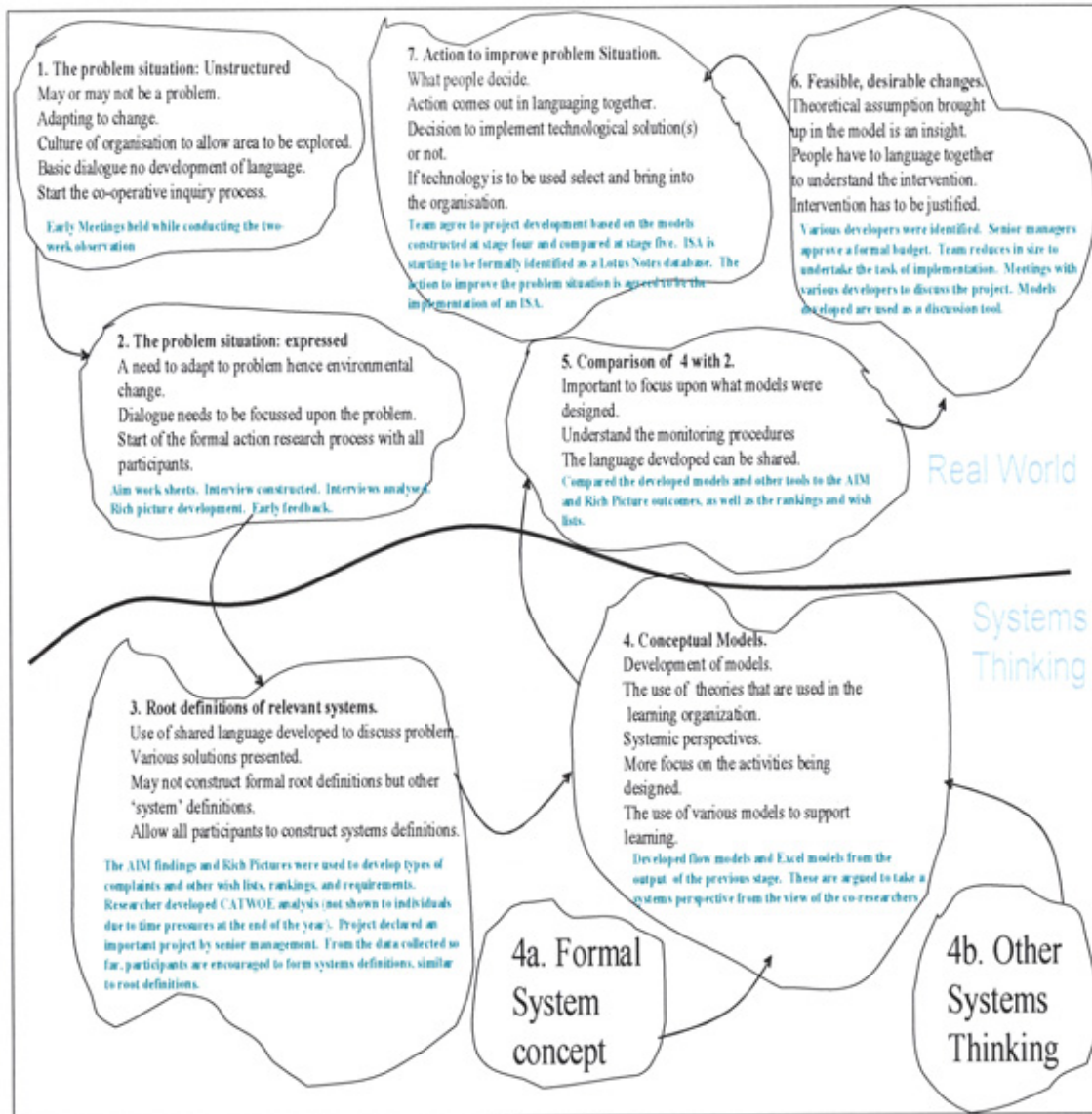


Figure 6.2  
*The SSM<sup>XL</sup> Framework with Activities Undertaken at BreathCo*

Figure 6.2 shows the tools and approaches that were used within each stage of the framework. The code and memo list (see Appendix F) that emerged from undertaking the research is included in the Appendices. Appendix F can be used as reference to support the analysis. The code and memo list were all created in ATLAS.ti through interviews and other data collection methods that were conducted throughout the life of the project. As a start for this research and for using this SSM<sup>XL</sup> framework, stage 1 represented a two-week observation of BreathCo employees at work.



**6.2 Two-Week Observation – Stage One the Problem Situation Unstructured**

Through the management of change research day (see Wainwright and Small, 2004) and a few informal meetings on site, access was obtained to the organisation. A two-week observation was negotiated where observation could be made on the Sales and Marketing, Quality, Planning, and Product Performance departments (as they were located together and shared an open plan office) in action. The aim was to hopefully identify a suitable project for the researcher to participate in, along with other individuals of the organisation using the methodology discussed in Chapter Five. These observations also allowed the identification of issues relating to the stream of cultural analysis, that Checkland and Scholes (1990) argue as; needing to be constantly reviewed. The project would hope to include the implementation of some form of technology in which SSM<sup>XL</sup> could be utilised and tested in action. The key informant throughout the two-weeks was the customer services manager.

As well as identifying a suitable project, the two-weeks were used to accomplish a number of other tasks. These tasks represent issues discussed within Chapter Five upon conducting the research through ethical implications, document collection and recording observations. The researcher wanted to present himself to the individuals of the organisation, as not only a competent individual and a researcher, but as an individual not to be feared. The two-week period was also spent moving around the open plan office sitting next to individuals as they undertook their jobs, asking questions and generally helping out where possible. At the same time, it was made clear that a project was sought and this was not a chance to spy upon individuals, but any problems that an individual frequently faced may instead be solved through a project. The outcome of such a project would hopefully make each individual's job easier. A map of the open plan office where most of the two-weeks were spent can be seen in Figure 6.3.

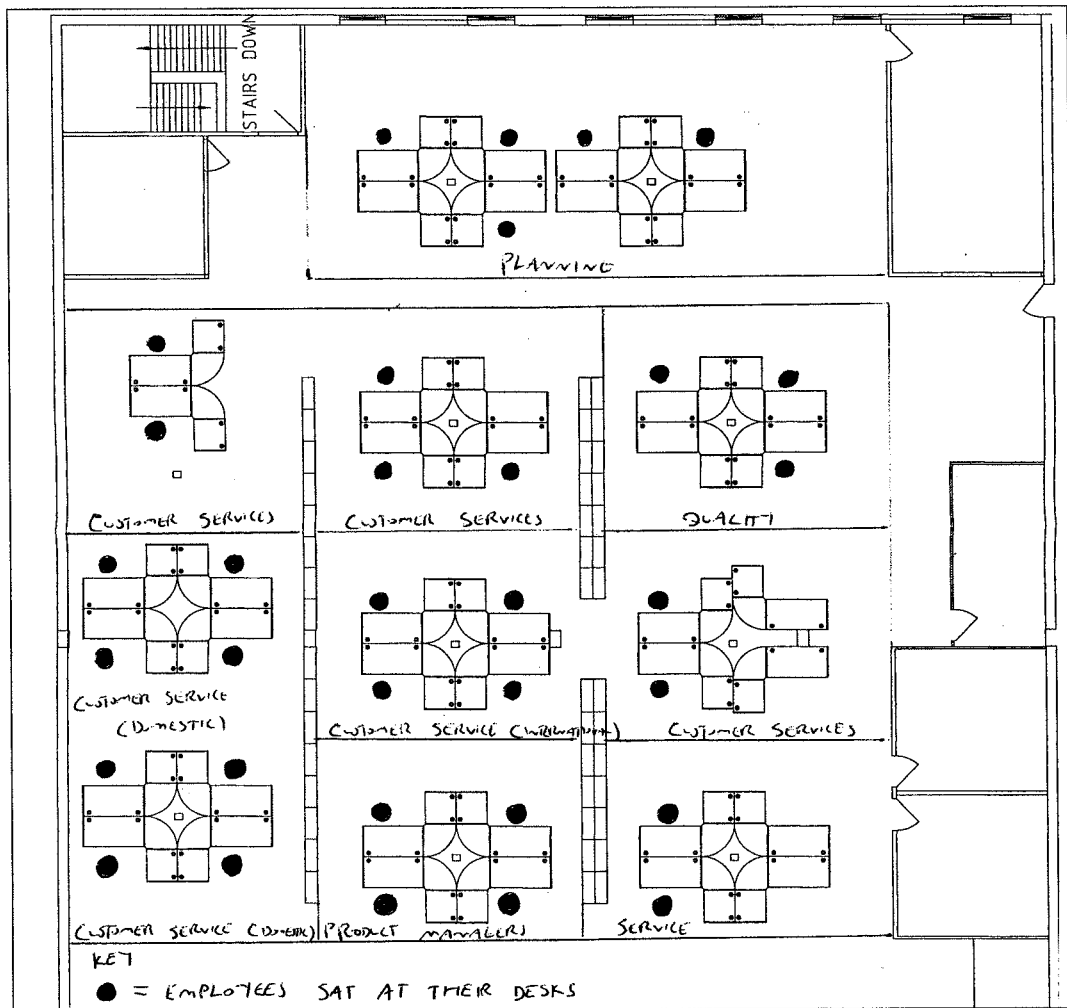


Figure 6.3  
*BreathCo Office Layout*

Figure 6.3 has been constructed to show the office lay out and individuals sat at their desks. It should be noted that the partitions did not act as a way to separate departments as individuals regularly got up and moved around the office. Figure 6.3 is divided up to display where the different departments were located. When the researcher was not observing individuals, and asking questions, he was sat with the customer services manager. To give a further understanding of how BreathCo was organised, an organisational chart was collected. A summary of the chart can be seen in Figure 6.4.

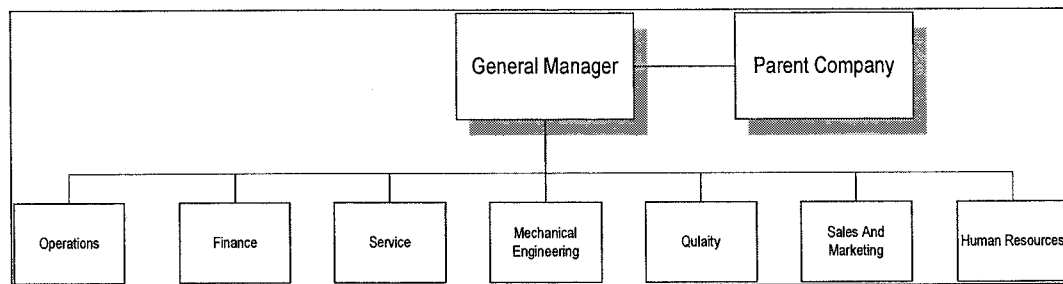


Figure 6.4  
*BreathCo Organisational Chart*

Figure 6.4 shows how BreathCo is organised however; each of the departments contains other units that make up the department, which are not shown to protect the organisations identity. For example, within sales and marketing there are customer services and marketing functions. Upon obtaining a detailed organisational chart of the sales and marketing section, it was noted that the department was split into domestic and international sections with jobs that overlap. For example, the customer services manager was responsible for functions in both the domestic and international markets. By organising the department this way, it was unknown how individuals were affected in relation to issues such as time and defining areas of responsibility.

Throughout the two-weeks, detailed observations were recorded in a diary. Within the diary, information relating to general problems the individuals of the organisation faces, as well as the identification of the customer complaints/concerns management project was recorded. It is these problems and the identification of the project that is now focused upon.

#### **6.2.1 Project Identification and Selection**

The current sales staff are structured into the different product categories (e.g. tubes, breathing apparatus); this has caused problems for customers who get passed around from one employee to another, as each particular employee did not have knowledge of a particular product range (Researchers Diary, August 2003). All employees however, are going to be trained to handle all product ranges in the near future, causing a change within the structure of selling (Researchers Diary, August 2003). Through talking to the sales staff about the re-organisation, an impression was obtained of the planned change and it was one of unhappiness (Researchers Diary, August 2003). Other problems identified from speaking to employees, relate to a lack

of technology within the organisation. It was believed a database was required to keep sales information on. The main technology individuals used throughout the organisation was SAP, but it was found difficult to use. Any requests for technology issues have to go through BreathCo's computer department (EDP). Requests for training, including ISA, could be sought, as money has been received from the EU for this specifically. Due to the current time pressures employees were under, individuals had little time for such training (Researchers Diary, August 2003). The senior managers of the organisation are very focused upon sales as one employee stated "*senior managers are too hung up on monthly figures, I think they must be on a bonus*" (Researchers Diary, August 2003). It needs to be highlighted that a focus on sales could impact on trying to operationalise SSM<sup>XL</sup> and the theories of the learning organization. This thinking could be considered as no time would be set aside to explore such issues and as a consequence render the framework useless.

Other departments visited during the two-week observation included: technical documentation, marketing, planning, and warehousing. No project was identified that SSM<sup>XL</sup> could be used in conjunction with by visiting these departments. A project that could tackle general organisational problems may add the most value to this research project and the individuals of the organisation. Such a focus on sales left only little time for individuals to undertake other tasks besides their primary job. This has led to a number of communication problems between departments. This can be highlighted through a conflict observed between the customer services departments and planning over an agreed change to a specific customer product. The agreed change to the product was not undertaken, and the standard product that is sold, without being adapted was ready to be shipped to the customer (Researchers Diary, August 2003). With these communication problems and other customer demands being placed upon the individuals who make up the organisation, it was perceived the most suitable project was a customer complaints project that had just been started. It is argued capturing customer complaints, solving them, communicating the findings, and learning from the problems would make the individuals of the organisation more effective. The need for the project was highlighted during a recent ISO audit (Small, 2005).

The initial meeting attended was the second meeting held about the overall project. The project was being conducted for the benefit of all individuals, so senior management looked to participation from a variety of departments. It could be stated that the approach adopted by BreathCo resembled what Greenwood and Levin (1998) call a search conference. A search conference is a meeting of a number of individuals focusing on a problem that requires the selection of certain individuals that will have something to contribute (Greenwood and Levin, 1998). The individuals who were asked to participate, represented Quality, Customer Services, Planning, Shipping, Technical Support, and the Repair Shop. The project leader was from the Quality department (see Figure 6.1) along with another member of the Quality department, the customer services manager and, another representative from customer services who became the main individuals within the project team (see Figure 6.1). Whilst not exactly the same as a search conference described by Greenwood and Levin (1998), as meetings were held on site and not in a retreat. At the meetings all participants talked about the history of complaints within BreathCo, which is an important aspect of a search conference and raised action points that needed to be focused upon. By talking with the project leaders two things were recorded. Firstly, the team could have put in minimum effort and produced a quick corrective action that would pass the ISO audit. The project leaders however, wanted to implement something that would not only pass the audit, but would be a practical tool that individuals of the organisation could find value in. Secondly, the envisioned data to be collected could be used to pin point the organisations current weaknesses, and future improvement projects could be initiated to tackle and reduce these problems (Small, 2005).

All meetings are structured using the BreathCo philosophy, which will be termed GREAT, as to disguise the identity of BreathCo. The GREAT philosophy contains a number of tools for solving organisational problems and running projects such as the CCM project. A favoured tool to chart the progress of a project is an action list (see Appendix G for an example). Action lists are used as a recording and communication device to inform individuals of what actions need to be performed, what the action will aim to achieve, who will be responsible for the action, a completion date if applicable, and the current status of the action point.



Using the action list created at the first meeting (Early July 2003), it was found that discussions had already focused upon finding an ISA, as the best envisioned way to solve the problem of handling customer complaints. This meeting discussed firstly, a proposed SAP module that could be integrated into BreathCo's current SAP modules, a standalone software package, and a Lotus notes solution (another common technology already in use at BreathCo). Secondly, the meeting was used to try and classify what a complaint meant to the individuals of BreathCo. A project was identified that required the implementation of an ISA, as indicated by the perspective of the project team, as the best way to solve the unstructured problem that the individuals of the organisation experience. This can be stated as; needing to further explore what a complaint constitutes, which is argued as relating to the team developing a language together. This was highlighted and argued for through the literature review (especially Chapter Three). Through the outcomes of the meeting the customer complaints project was identified as being suitable for this research project. The two-week observation and the identification of the project can be seen as phase one (the problem situation unstructured) of SSM<sup>XL</sup> shown in Figure 6.2.

The main outcomes of the meeting included arranging a demonstration of the SAP and standalone software packages, to consult and explore how other organisations deal with complaints and, to further discuss what a complaint is. The researcher approached the project leader through the customer services manager about the possibility of joining the team. Advantages were put forward of the project gaining an extra resource, who would also contribute ideas, whilst the personal advantage was gaining access to a suitable project (Small, 2005). The project leader agreed so the amount of participation expected increased. It was explained to the project leader, and the customer services manager, that the researcher wanted to be involved as a team member and not provide all of the suggestions and answers (Small, 2005) in a consultancy manner. A simplified explicit framework as stated by Lau (1999) was discussed with members of the team. To accompany this, the principles of co-operative inquiry were raised but were greeted with less enthusiasm due to the perception of containing only academic merit. This could be down to what Heron (1996) declares as how the subject was approached. Nevertheless, the project leader agreed that what was discussed was suitable to adopt as a strategy, and it was the only way this project would be conducted with participation from all individuals. For the

remaining discussion therefore, the term ‘team’ will include the researcher as a co-researcher and co-subject unless specified. From this point, the degree of participation as discussed by Heron (1999) and discussed in Chapter Five was A/D (Researcher Full, Subject Full / Researcher Full, Subject Full). Table 6.1 shows a copy of Table 5.2 in addition, re-demonstrating this degree of participation (as a reference for the reader).

		<b>Researcher</b>	<b>Subject</b>
<b>Political</b>  Involvement in research thinking and decision making	A	Full	Full
	B	Full	Partial
	C	Full	Nil
<b>Epistemic</b>  Involvement in experience and action being researched	D	Full	Full
	E	Partial	Full
	F	Nil	Full

Table 6.1

*A Copy of Table 5.2 on Kinds and Degrees of Participation in Co-Operative Inquiry*  
Source: Heron (1999 P118)

Having identified the project, gained access to the project, and having joined the project team, SSM<sup>XL</sup> could now proceed to the second stage. As shown in Table 6.1, this is where the problem situation of solving customer complaints could be expressed. This is now taken up in the next section.

### 6.2.2 The Primary Data Coding Scheme

Throughout collecting the primary data, initial coding was being undertaken. As more data was collected and transcribed, the coding structure was continually refined. As has been highlighted, the code frequency table created from the output of ATLAS.ti has been produced and can be seen in Appendix F. This list is presented in alphabetical order along with how many times the code was used throughout the project. It is through these codes, the quotations marked and other memos created, that the networks were constructed. This allowed theories and other thinking to be explored and developed, which in turn are presented throughout the analysis.

**6.3 Focusing the Project – Stage Two the Problem Situation Expressed**

Soft Systems Methodology (SSM), as developed by Checkland (1993) and Checkland and Scholes (1990), was designed to investigate ‘fuzzy’ problem areas and then construct relevant systems to help uncover a more suitable course of action than a traditional hard methodology may allow (see Chapter Two). The first aspect that SSM<sup>XL</sup> has to undertake, is to explore what the meaning of a complaint actually is for the project team. This is the basis of the dialogue development issues incorporated within the framework. This was further emphasised at the project meeting where one participant stated, “*what is an actual complaint and what is a perceived complaint?*” (Researchers Diary, August 2003). Only by exploring ‘complaints’ and developing a language around ‘complaints’, can a suitable solution in relation to customer complaints be implemented, which would be classed as successful. A project meeting in early August 2003 had attempted to define a complaint through a brainstorming exercise. The outcome of this exercise can be seen in Table 6.2.

Service Availability	Stock Cycling	Appointments Missed – Late
Marketing Information Insufficient	Telephone: System/Mailbox/Answerer Time/Attitude/Competence/Switchboard	Incorrect Product Sold – Advised
Late Delivery – Required/Promised – 3 <sup>rd</sup> Party	Products No Longer Supported	Documentation Incorrect
Wrong Delivery – Goods Address Lost – Quantity/Damaged/Short/Out Of Date/Calibration	Price	Invoice – Wrong/Not Received/Action Suspended
Turnaround Time – Order Confirmation – Quotation – Response – Request	Missing Documentation	Stock Availability
Single Point Of Contact (Passed to Pillar To Post)	Product Fault – Quality	
Technical Support – Resource – Quality	Calls Not Returned	

Table 6.2

*Project Teams Brainstorming Exercise upon what is a Complaint*

Table 6.2 went some way to clarifying what a complaint meant to the team, however, confusion still remained in defining a complaint. Due to a number of the project team

going on holiday through August and September 2003, the project was suspended until early October 2003.

Upon the project, resuming in early October 2003, which can be seen through the design section of Figure 6.1 and stage 2 of Figure 6.2, the emphasis upon the co-operative element, moved from the original A/D perspective to a more B/D (Researcher Full, Subject Partial / Researcher Full, Subject Full) perspective (Small, 2005). This change was required to try to get the team to start to share a dialogue (cf. Bohm, Factor and Garrett, 1991; Dixon, 1998; Isaacs, 1993) upon the problem situation, and prepare to adapt to the change the solution will bring to each member of the team, and the organisation. Due to the differing perceptions of what a complaint is, it was arranged with the team that a number of interviews would be held so that differences could be highlighted in a different manner. The outcomes were to be used to help focus the project and create a language about 'complaints'. A proposed plan of action was presented to the customer services manager and the project leader in early October 2003 (Researchers Diary, October 2003). To further highlight the difficulties that the project presented, a diary recording at the end of October listed a number of problems from a customer complaints meeting. The first problem was the minimum number of individuals that were able to attend the meeting (Researchers Diary, October 2003). The second problem related to one individual dominating the meeting even though she was not one of the project leaders. Whilst this is not a problem as such, it could have restricted participation of other individuals. The main problem seemed to be centred on purely finding a solution to the problem and not defining or exploring customer complaints (Researcher Diary, October 2003). It was argued that a systems thinking perspective within SSM<sup>XL</sup> would help individuals, once the problem area was explored. Secondly, focusing upon the co-operative inquiry features would prevent any individual from dominating meetings. This thinking needed to be communicated. The tools that were used to collect the data for this phase of the project were the Venn diagrams used within the appreciative inquiry method (AIM) (see West, 1995), semi-structured interviews, and the development of rich pictures.

### 6.3.1 The Appreciative Inquiry Method

Upon the project leader's agreement to undertake a number of interviews, the customer services manager helped draft an interview schedule commencing from the end of October 2003 and finishing in early November 2003 (see Figure 6.1). The customer services manager drafted the interview schedule for two reasons. Firstly, to stop researcher bias in selecting participants that were familiar. Secondly, individuals that would be on the project team could be selected but individuals that were not could also be included if they could provide the project team with additional thinking. To help structure the interviews, the Appreciative Inquiry Method (AIM) was used (see West, 1995). As stated, only the first phase of AIM was undertaken with the Venn diagram being used. The Appreciative Inquiry Method Venn diagram worksheet (see Chapter Five) was issued to thirteen individuals. If the methodology was to be used, it was important that no individual was forced to complete the worksheet, or forced to be interviewed. All individuals were asked if they would participate and it was explained what would be gained by completing the sheet and in turn the relevance of the interview. It was pleasing to see that all individuals were interested in participating so that they could be involved in the research, the action process (Wainwright and Small, 2004), and the reflections that would be undertaken.

The AIM Venn diagram sheet that was given to individuals contained two pieces of paper, with a statement encapsulated in a bubble in the centre of the page. On the first piece of paper the statement read "*what is a customer complaint?*" and on the second, "*reasons for handling a customer complaint*" (Small, 2005; Small and Sice, 2004; Wainwright and Small, 2004). An example can be seen in Figure 6.5.

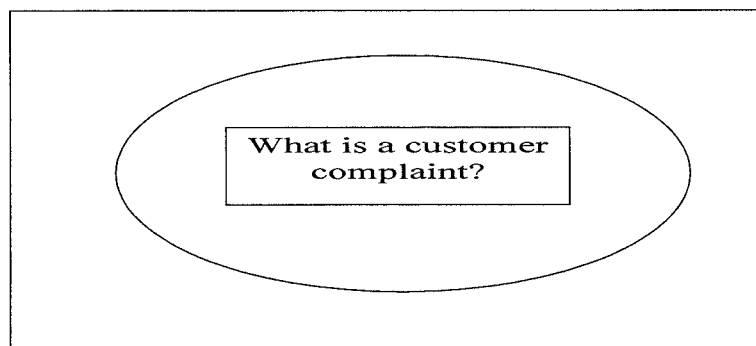


Figure 6.5  
*The Appreciative Inquiry Method*  
Adapted From West (1995)

The reason this approach was adopted was to collect the many different perspectives that team members had about complaints and why they thought a complaint should be solved (Small, 2005). The sheets were distributed at the start of the week to each individual who would be interviewed and collected on a Friday in the middle of October 2003. The sheets were analysed by grouping similar categories together by request of the team. The outcome of the Appreciative Inquiry Method's Venn diagrams provided an insight into the themes that needed to be further explored through the interviews, and also provided areas for further exploration with each individual.

### **6.3.2 Conducting the Semi-Structured Interviews**

The semi-structured interviews were drafted from the AIM Venn diagrams and contained three sections (see Appendix H, Section H.0). Section one contained general questions with section two focusing upon managing complaints. Section three examined each individual's perspective of a perfect solution to customer complaints, whilst the final section concentrated on any other issues that came from the Venn diagrams. At each interview, all participants were informed that they did not have to answer any questions or have the interview recorded. No individual refused to answer any questions or have the interview recorded. Two interviews were conducted each day and lasted between 20 and 45 minutes (Small and Sice, 2004; Wainwright and Small, 2004). Upon completion, the interviews were transcribed and analysed again at the request of the team. Through these interviews and the AIM Venn diagrams, the researcher would interpret each participant's understanding (cf. Alvesson and Sköldberg, 2000) of handling customer complaints.

#### **6.3.2.1 Interview Outcomes**

The practical outcome from the interviews was an informal document that contained a compiled AIM Venn diagram sheet and rich picture models, which are discussed further in section 6.3.4, Feedback of Results. Besides trying to draw out each individual's thinking on how best to undertake and complete the project, the interviews also highlighted other factors that were observed during the two-week observation. By coding the data in ATLAS.ti, it was found the key themes emerging referred to issues such as: communication, departmental co-operation, using IS, organisational awareness, organisational effectiveness, project management,

resources, senior management support, senior management empowerment, and time issues. These themes were touched upon when the work was fed back to the participants but was not discussed in detail. An overview of these frequencies will be discussed in the next chapter as part of the analysis.

The customer complaints/concerns management project, as has already been stated, was initially identified to undertake the problem caused by customer complaints. Addressing customer complaints through an ISA solution, may allow issues observed during the two-week observation period; relating to the requirements of the customer services department, to be incorporated in to the technology. It may also be pointed out that solving complaints may require departments co-operating more effectively with each other, which as demonstrated above can be difficult at times. If complaints can be solved using an ISA, learning could occur through the design and implementation aspect as well as through the history the IS would create. Also, the technology could free up individuals time as they could conduct tasks through the ISA instead of physically locating the necessary individual within the organisation. If the ISA produces these outcomes, it can be theorised that the IS could create basic learning organization conditions (e.g., learning is a continuous process and listening to customers) as does the literature that has been reviewed (see Appelbaum and Gallagher, 2000; Boud and Middleton, 2003; Choueke and Armstrong, 1998; Garratt, 1999; Pedler, Burgoyne and Boydell, 1997; Nonaka, Toyama and Konno, 2001).

As the team is designing the 'system' and not having a 'system' forced upon them, it is theorised that if this 'system' related to an IS, the IS would be accepted into the organisation's culture (cf. Lennon and Wollin, 2001; Garratt, 1987). As an ISA can reach all parts of the organisation, more individuals could come into contact with the IS and become exposed to the complaints received and resolved, which could create new knowledge and learning for that individual (cf. Kransdorff, 1998). This knowledge could then be applied within an individuals' job which otherwise may have gone unnoticed. Two issues relate to this thinking. Firstly, for these predicated outcomes to occur an ISA would need to be implemented, which may or may not be the best solution to the overall problem, as this needs to be investigated. Secondly, in order to implement a solution, communication, and departmental co-operation needs to be improved. These issues can be tackled through using SSM<sup>XL</sup>. On examination

of these two issues, it looked increasingly likely that some form of ISA would be implemented due to the first project meeting (early July 2003) focusing upon ISA solutions, before investigating the problem situation further. A theory was developed that if the project leaders have a focus upon implementing an ISA before exploring the problem situation, a technological solution may not provide as much value as first thought, if other individuals on the project team do not hold the same perspective. This thinking was linked to individuals concentrating on IS during the early stages of the project. To encourage this thinking further, whilst conducting the interviews, a meeting was held where a consultant from SAP attended. The consultant demonstrated the advantages of a SAP module specifically designed to manage an organisation's customer complaints. Even though a SAP solution may not be the best approach, the seeds were being sown for implementing a solution using technology.

If an IS solution was in the thinking of the project leaders, as well as other individuals, it was relevant to the methodology developed and to the team, that other thinking could be explored. As the researcher instigated the Venn diagrams from the Appreciative Inquiry Method (see West, 1995) and conducted the interviews, it was important that the feedback was presented in a format that allowed the team to start a dialogue. The dialogue needed to be based on the issue of customer complaints, not necessarily concentrating on an ISA, and any action that started was relevant to solve the problem. Rich pictures (see Avison and Wood-Harper, 1990; Checkland, 1993; Checkland and Scholes, 1990) were the tools that were selected for this process, along with the compiled AIM Venn diagram worksheets.

### **6.3.3 Feedback of Results**

To emphasise the differing opinions that individuals presented, through their AIM (see West, 1995) Venn diagrams and interviews, varying rich pictures were constructed. Before reviewing a selection of rich pictures an example of a compiled AIM Venn diagram depicting '*what is a customer complaint?*' can be seen in Figure 6.6.



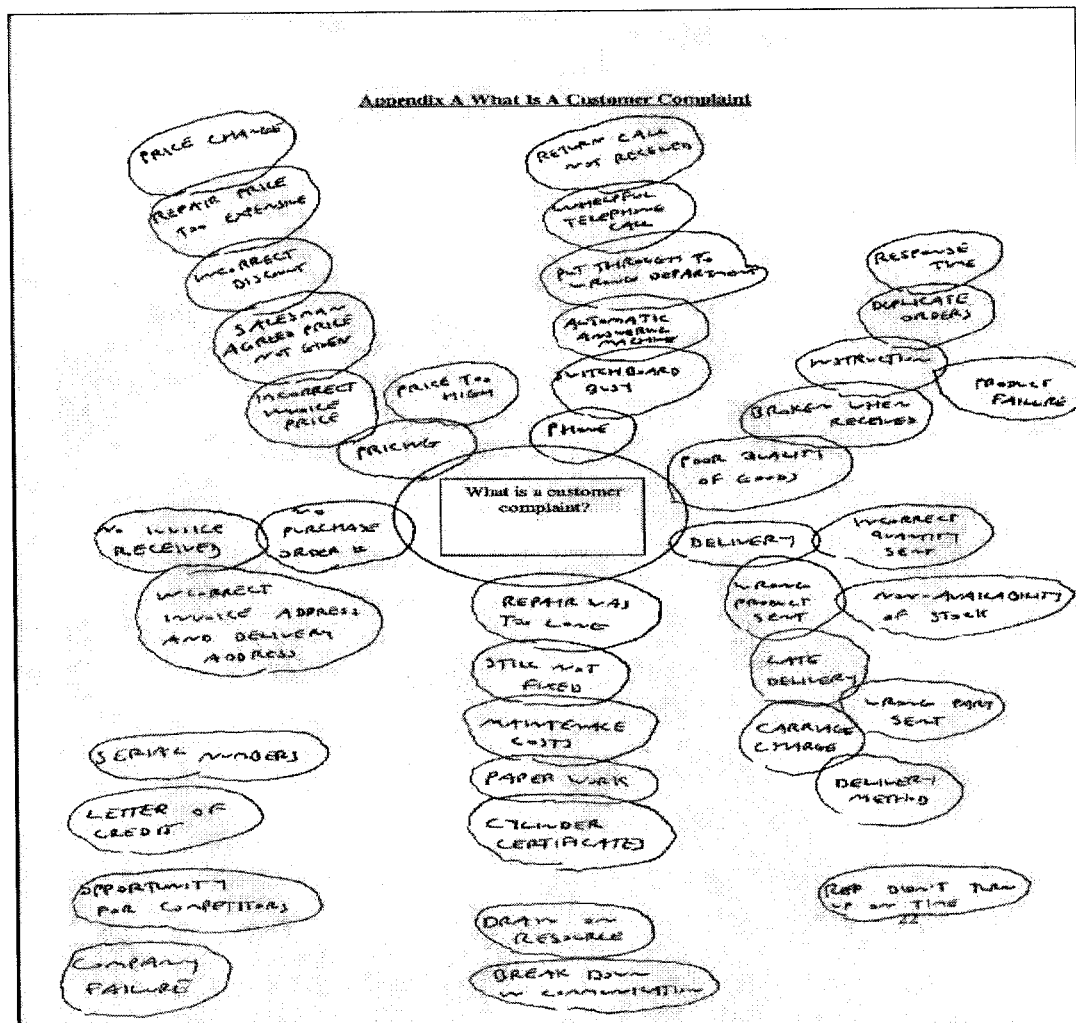


Figure 6.6

*The Compiled Outcomes of the Appreciative Inquiry Method*

It is important to notice the grouping of the themes within Figure 6.6. These grouping represented answers individuals considered, with reference to their roles within the organisation. For example, all issues relating to repairs came from the repair shop employees and not from individuals involved with Quality or customer services. In comparison, the customer services individuals stated delivery issues are complaints, whilst the Quality individuals focused on quality issues. If these individuals only hold their opinions of what is a customer complaint, it will be these issues that will be the focus in providing a solution to the problem. Rich pictures were used to try to eliminate this form of thinking and provide the team with different areas of thinking.

The rich pictures constructed do not follow the conventional use of the technique. As an example, Figure 6.7 is produced from the project leader's interview to demonstrate what was produced within the document.

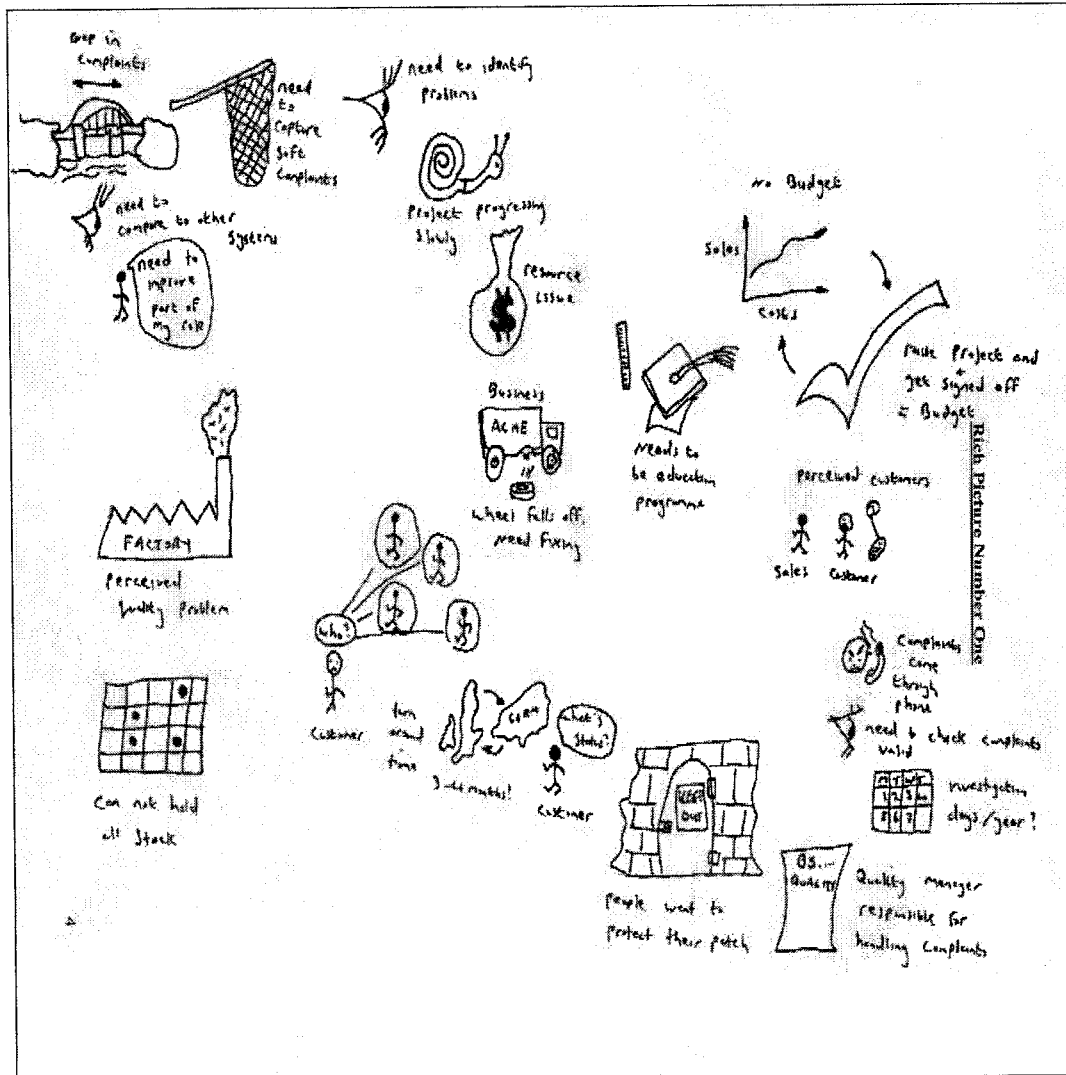


Figure 6.7

*A Rich Picture Based on the Project Managers Interview*

Source: Small and Sice (2004)

Figure 6.7 does not demonstrate the overall picture of the problem situation but key aspects that are argued to be important and, could emphasise differences to other members of the team, that can then be brought out in a dialogue. Conventional symbols such as an eye to demonstrate looking, and matchstick men to demonstrate individuals were used. In the rich pictures constructed, an attempt was made to maintain consistency using the same symbols throughout to mean the same things.

The rich pictures were also not really presented in sequence but did start in the top left corner and worked their way around the page. The rich picture shown in Figure 6.7 demonstrates the perceptions and mental models the project leader held including: the acknowledgement of a gap in the complaints procedure (the bridge), the project progressing slowly (the snail), the problems with resources (the bag of money) and the perception that other people want to protect their own areas of responsibility (the door with a keep out on the front) to give but a few examples.

A further example of what these methods, and the second stage of SSM<sup>XL</sup> is trying to achieve, will now be explained. From the two-week observation, and the researchers diary, kept from the early meetings (August, 2003), the focus of the team was on 'developing a *'system'* to handle customer complaints and not on solving 'customer complaints'. This use of language represents that the team plan to design and implement a 'system' to handle complaints, emphasising that complaints are inevitable. This is supported from the project leader's interview and rich picture (see Figure 6.7 above) when he stated a need to improve comes out as part of his job. By receiving complaints an improvement can be focused upon. This element of Figure 6.7 can be seen in Figure 6.8.

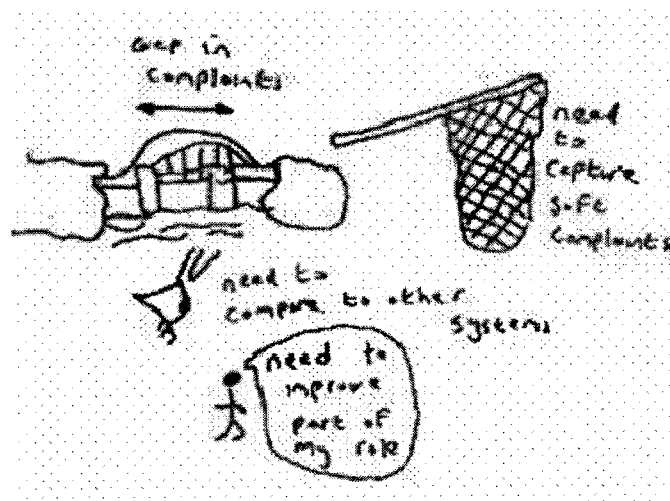


Figure 6.8

*An Element of the Rich Picture from the Project Leader*

A number of interviewees shared the opinion of the project leader whilst other participants pointed out that the issue of complaints has been raised before and nothing had changed

(see Figures 6.9 and 6.10). It is important to try to demonstrate these differences to the team and how they could impact upon any solution.

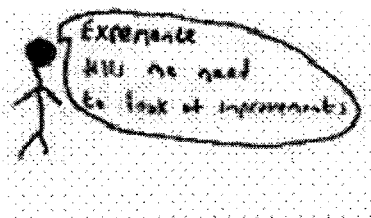


Figure 6.9  
*An Element of a Rich Picture  
from the Work Shop Supervisor*

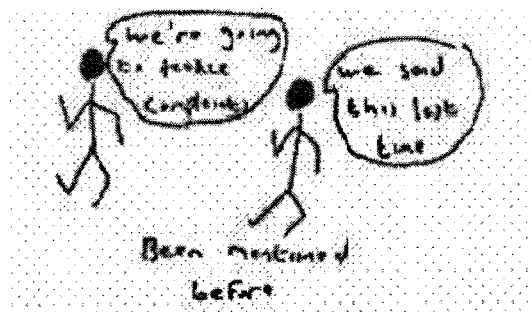


Figure 6.10  
*An Element of a Rich Picture  
from the Receptionist*

The document produced was designed to draw out the differences in thinking to try and challenge mental models and encourage processes such as double loop-learning. The rich pictures developed from the interviews were kept anonymous and were not placed in the order that the interviews were conducted (Small and Sice, 2004). Doing this ensured confidentiality and allowed individuals to focus upon the work structures, tasks, and processes displayed, and not on which individual the picture represented (Wainwright and Small, 2004). All interviews were referred to by a number only. A brief summary was included for each rich picture along with both compiled AIM Venn diagram work sheets in an appendix attached (Small and Sice, 2004).

Upon completing the document, an informal meeting was set up with the key informants including the project leader (The Quality Manager) and the customer services manager towards the end of November 2003. The purpose and reasoning for the document was discussed. The diary entry from the meeting captured the thoughts of the customer services manager when he stated, "*this is more comprehensive than we could have achieved*" (Small, 2005; Small and Sice, 2004). It was agreed that a copy of the document would be given to each member of the team (Researchers Diary, November 2003). It was hoped that each individual could explore a rich picture, or the completed AIM Venn diagrams, and generate a dialogue with other team members about whether they agree or disagree with the perspective (Small and Sice, 2004). By using these tools in this way firstly, it was considered to enable more effective learning to take place than just listing learning points decided by the

researcher. Secondly, it was hoped using the tools in this way allowed the participants to be in more control of the learning environment and rely less and less on a researcher or consultant. It was important therefore, that now the researcher had contributed to the project and helped the team focus more upon the problem situation that the emphasis was moved back to an A/D (Researcher Full, Subject Full / Researcher Full, Subject Full) co-operative perspective from the B/D (Researcher Full, Subject Partial / Researcher Full, Subject Full) perspective (see Table 6.1) that was used during conducting, analysing, and creating the document. A presentation was assembled to emphasise this key point along with the features of SSM<sup>XL</sup> (e.g., constructing root definitions and conceptual models).

Within the presentation, the co-operative element emphasised to all participants that being co-researchers allowed them to bring any techniques and thinking on how the project could progress and be developed (Wainwright and Small, 2004). The researcher therefore, as a co-researcher demonstrated the thinking he brought to the problem situation and why certain techniques were used. The document produced was further emphasised within the presentation as a tool for dialogue and is only one of many interpretations, which may or may not reflect everybody's thinking (Wainwright and Small, 2004). An attempt was made to change what Heron (1996) and Heron and Reason (2001) state as the researcher and researched classification (discussed in Chapter Five) (Wainwright and Small, 2004). If the co-operative element was to work, these points had to be communicated. It was hoped that each individual (co-researcher) could use the document as an example, if they were unsure of what could be presented, to communicate their issues relating to handling complaints from their past experiences (Wainwright and Small, 2004). Unfortunately, due to time pressures individuals' of the organisation was under to meet year-end sales in December (2003), no time was available to give the presentation.

Access to the organisation after the informal meeting in November, with the project leader and customer services manager, was not available again until early February due to key individuals having time off directly after Christmas. Contact was maintained through e-mail. It could be considered that SSM<sup>XL</sup> had to be fully conducted in 'mode 2' (a way to think about problem situations). Like Vidgen (1997) found, formally expressing the framework may be an unwanted process for the

participants involved in the project due to time issues. This thought could not be tested due to the presentation not being given. Upon re-gaining access into the organisation in February 2004, the development of models (stage 3 of SSM<sup>XL</sup>) was being undertaken.

#### **6.4 The Development of Models – Stage 3 Root Definitions of Relevant Systems and Stage 4 Conceptual Models**

After delivering the discussion document to the team at the end of October 2003, the debate upon; defining what is a complaint to the participants' of BreathCo, was completed in the next complaints team meeting (not attended by the researcher). Focus then turned to constructing proposed models of the 'system' (revealed on an Action List collected dated 31<sup>st</sup> October 2003). This can be shown as being conducted during stages 3 and 4 of SSM<sup>XL</sup> (Figure 6.2). As the presentation that was prepared to explain root definitions and conceptual models was not undertaken, joint activities between team members were limited, and work was carried out in each individual's spare time. Whilst these earlier meetings could be identified as more of an 'inside inquiry' (cf. Heron, 1996; Heron and Reason, 2001), the later meetings could be classified as what Heron (1996) and Heron and Reason (2001) state as an 'outside inquiry'. How this style of work therefore, could aid or hinder learning needed to be reviewed through the theories of learning. Whilst individuals carried out tasks in isolation, the chance to enter the zone of proximal development (cf. Vygotsky, 1978) is considerably reduced. However, it was decided by all participants that this was the best way to work, so it could be considered that all participants' behavioural, personal, cognitive, and environmental factors were suitable (cf. Bandura, 1986). Participants however, were still keeping in contact with each other when attending meetings even though they were limited.

Meetings were used to communicate the relevant activities individuals had undertaken and to discuss how the work should be refined. Modelling therefore, took what could be described as a proto-typing approach. This is considered as where an individual would construct a framework or model, the work was debated at a meeting, and was refined until a final model or framework emerged. This framework or model has to satisfy what was uncovered at stage 2 through the document and the other thinking that was brought out. As no formal CATWOE (see Checkland, 1993; Checkland and

Scholes, 1990) analysis was presented to the team due to the process used, the researcher constructed each individuals CATWOE perspective from the interviews undertaken and the AIM Venn diagram worksheets. This analysis is reviewed in the next chapter, whilst attention in this chapter will now turn to the models the project team produced.

#### **6.4.1 Frameworks and Models**

As the researcher did not have access to the organisation during the early stages of modelling, contact was maintained still making the researcher part of team. The degrees of participation changed again from an A/D perspective (Researcher Full, Subject Full / Researcher Full, Subject Full) to more of a C/F (Researcher Full, Subject Nil / Researcher Nil, Subject Full) perspective (see Table 6.1), as the researcher had contributed ideas but was not currently involved in the action or experiences. This therefore could have had an impact on the learning that was available to both the team members and the researcher. Issues such as these will be focused on in more detail when the formal analysis of this case is presented. What needs to be drawn out here is how the modelling was undertaken. The frameworks and models developed by the team focused on locating both existing company wide or, where applicable, specific complaint categories, and types of complaints received if they existed (Small, 2005). Through creating a dialogue, an information retrieval framework was developed shown in Table 6.3 expanded from the earlier brainstorming exercise shown in Table 6.2.

Table 6.3 was used to highlight the different categories of complaints, developed from Table 6.2. Table 6.3 further expands Table 6.2, by focusing the complaint categories as well as including various departments where data should be collected, and finally the questions that need to be asked that will highlight how current complaints are undertaken within the organisation. If any questions could not be answered, this would highlight an area that needed to be incorporated in any solution, if the problem of solving customer complaints is to be successful. It is also argued that this adds to the learning that can be achieved by challenging participants' mental models (cf. Senge, 1990) on particular issues and allows these to be explored further. The theories of learning could be used to help explore these issues further through the zone of proximal development (cf. Vygotsky, 1978) and the processes of practice,

meaning, identity, and community that make up a community of practice (cf. Wenger, 1998). This is considered as participants will actively collect this information from their departments and share what their investigations have found, in comparison with having a formal process forced upon them which they may not understand. It could be argued that Table 6.3 is similar to what Stowell and West (1994) declare as a decision table.

<b>Categories of Complaints</b>	
	(a) Telephone (b) Technical Support (c) Deliveries (d) Quality of Product/Service (e) Documentation
<b>By Department</b>	
	Service "in house" Service "Field" Training Warranty Quality Development Sales and Marketing Shipping/Warehouse
<b>Questions to aid in identifying current customer complaints procedure. All questions to be considered for each category of complaint above</b>	
<b>1</b>	What department/company complaints procedures would/ do you follow?
<b>2</b>	How is a complaint first received?
<b>3</b>	how is the complaint recorded/ logged?
<b>4</b>	How is the progress of the complaint monitored internally?
<b>5</b>	How is the complainant updated? with the progress of the complaint?
<b>6</b>	How is the complainant informed when the complaint issue is complete?
<b>7</b>	How are closed complaints stored?
<b>8</b>	By what means can the complete complaints be referenced?

Table 6.3  
*The Information Retrieval Framework*

Accompanying Table 6.3, through the outcomes to the questions, a further emphasis on the need for a solution in association with technology was identified. To aid with selecting a technology-based solution a 'wish list' (Small, 2005) or weighting scheme was created and is shown in Table 6.4.



User Friendly	Upgrades Available	SAP Link
Report Function – Easily Understood	Networkable	Historical Data (storage/access/analysis)
Windows Compatibility	Generate Auto-Response to Customers (e-mail)	Supplier Support
Coding Structure	Calendar	Lotus Notes Compatible
Analysis Tools	Editing Of Complaints Facility (protected/admin rights)	Auto Feedback To Complaint Generator (internal)
Generate Reports That Can Be Customised	Ability To Attach Documents	Training
Documentation	Auto Status/Progress Data	Remote Access For Reps
Search By Customer	Search By Category	

Table 6.4  
*The Technology Wish List*

Table 6.4 demonstrates some of the key features the IS should contain if customer complaints are to be handled. These issues relate to being windows compatible, being able to handle a coding structure for complaints, and being able to be compatible or interface with SAP (Small, 2005). Whilst no formal ranking approach was used, Table 6.4 could be argued to take the form of a decision table also (cf. Stowell and West, 1994). It could be considered that the team using the processes that they did to model different solutions, as part of the SSM<sup>XL</sup> framework, allowed more learning to be engaged in. For example, using the information retrieval framework could allow double-loop learning (cf. Argyris and Schön, 1978) to be undertaken on complaints and participants perceptions on complaints, building on the work undertaken at stage 2. By discussing and dialoguing these issues, a better insight into the problem area and possible solutions could have been obtained, which undertaking another process or technique may not have. These approaches may allow the learning organization thinking (e.g., team learning, mental models, shared vision and personal mastery) of Senge (1990) to be better developed tactility within the complaints/concerns community. It is pointed out that these approaches could only have been achieved by the participants coming together, reinforcing the argument that it is the social aspect of learning that is important to remember. These issues will be further reviewed in the next chapter. Using the outcomes of Table 6.3 and the wish list developed in Table 6.4 to rank any technology solutions, the end of December 2003 and the start of January 2004 focused primarily on two alternative solutions (Recorded on Action Lists dated 21<sup>st</sup> December 2003 and 10<sup>th</sup> January 2004). The first solution still

considered a SAP solution, whilst the second was a solution based on Lotus Notes. Both solutions were able to fulfil the wish list requirements demonstrated in Table 6.4.

In order to make a decision upon which solution would best suit BreathCo, the head of BreathCo's computer department (EDP) was invited to attend a meeting to present his perspective. Using Wenger's (1998) theory on communities of practice (COP), it could be argued that the EDP manager represented a new participant to the complaints/concerns community. Further to this argument, Vygotsky's (1978) theory on the zone of proximal development could be used to see how the perspectives of the EDP manager can be acknowledged and allow the other participants to learn how best to demonstrate their ideas and thinking to the EDP manager or other information systems developers. The EDP manager told the team to demonstrate how they propose the process should look in terms of appearance, which could be shown to information specialists who could undertake the development. To accompany this representation, it was suggested by the researcher that 'system' definitions could also be conducted. These definitions were designed to be root definitions but with the language of SSM removed (cf. Lewis, 1994; Vidgen 1997). For example, this was demonstrated by drawing on the interviews conducted with the participants, to construct different participants root definitions. From the interviews three root definitions were constructed or as was stated 'system definitions'. These included,

*"A BreathCo owned and operated system to capture external customer complaints in a cost effective manner, which can be used to make BreathCo more effective."* The second definition was,

*"A BreathCo owned and department operated system to capture external customer complaints in a cost effective manner which can be used to make BreathCo more effective."*

Finally, *"A senior management owned and BreathCo operated system to solve unsatisfied external customers problems by satisfying them by whatever means necessary."*

The purpose was to try and demonstrate by examining different processes within the CATWOE, different 'systems' could be implemented. Other participants were not so sure this would add value to the project as it could turn into a repeat of how the early brainstorming sessions were conducted, with continuous revisions of the same processes and no real progress being made. This is the advantage of CATWOE as it allows participants to focus on specific issues. Not using CATWOE may have reduced the opportunity for learning to occur, but to force such an issue would violate the methodology adopted. Whilst the EDP manager sought perspective organisations that may undertake the 'hard' programming of the technology, the models were being created by the team, that could be shown to an information systems development team based on all the work that has preceded it. This moves the project into stage 4 of SSM<sup>XL</sup>.

Before reviewing these models, it is important to highlight a change in the projects status by senior management. The project was initially handed to the team to tackle. However, senior management had decided to reclassify the project as important for BreathCo, and had put pressure on the team to implement a solution by the end of March, and as a consequence the technology had to be rolled out to the rest of the company in June 2004 (Small, 2005). This timing was to coincide with when the ISO auditors returned in April, so that they could finally see some progress. Along with the change in emphasis of the project, a new building was under construction that would replace the open plan office (shown in Figure 6.3) where each department (Customer Services, Planning, Marketing Accounts, and Human Resources) would have their own work areas. With an emphasis on the social aspect of learning and the three theories of learning identified, moving participants away from each other could restrict the informal learning the project could have produced. Issues such as this need to be further examined in the formal analysis chapter.

#### **6.4.2 Modelling Outcomes**

Upon completing stage 3 of SSM<sup>XL</sup>, the team were able to start the modelling exercises that are required at stage 4. To help with developing models that could be shown to prospective developers on how the ISA should look, if the 'system' is to be created, flow models were constructed from the information that came out of Table 6.3. The main customer contact methods were mapped, as well as mapping how a

complaint, that has entered the organisation, can be categorised and stored. The first flow model can be seen in Figure 6.11.

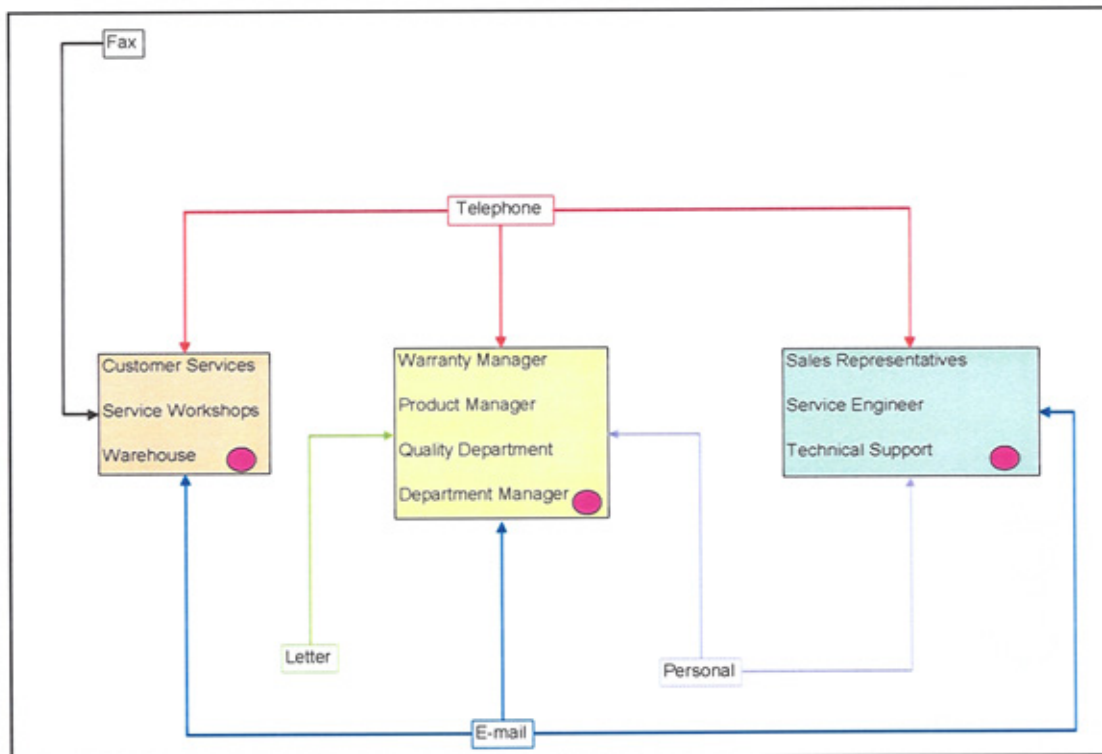


Figure 6.11  
*Customer Contact Methods and Routes*

Figure 6.11 demonstrates the first flow model created. All flow models can be seen in Appendix I. From this top-level, other models demonstrated where a technological solution would be placed within the process of this 'system' (Small, 2005). The models could then be compared. Whilst Figure 6.11 is not a conceptual model, it could be argued to resemble a black box diagram (cf. Stowell and West, 1994). The model was designed on the basis of where a complaint originates within BreathCo and where it can flow to as being important. From this top level, other models were constructed and compared to see how a solution would need to be designed to capture complaints based on the black box diagram (see Appendix I). The argument could then be made that in SSM, these models do not take a systems perspective as 'real world' activities have been used within the models. Whilst this is a valid point, going back to the work of Robb (1997), he notes that participants may not have time to construct formal root definitions and conceptual models. This seemed to be the case with the participants of BreathCo. Whilst the models may not take a formal systems model (i.e., a conceptual model), it is argued that the models did take a systems

perspective, due to the constructing of models based on how best a solution would tackle the problem and not just on technical issues, or what is believed to be required, for example. To accompany these models through the outcomes of Table 6.3, a complaint category list was modelled and can be seen in Table 6.5.

Communications			Service			Errors		
C1	System fault		S1	Service engineer availability		E1	Documentation missing	
C2	Mailbox fault		S2	Service engineer late		E2	Documentation incorrect	
C3	Mailbox misuse		S3	Service engineer missed appointment		E3	Wrong product supplied	
C4	Time to answer		S4	Quotation response time		E4	Wrong product advised	
C5	Operator attitude		S5	Confirmation response time		E5	Invoice incorrect	
C6	Operator competence		S6	Product turnaround time		E6	Invoice not received	
C7	Switchboard operation		S7	Technical support availability		E7	Action suspended	
C8	Call not returned		S8	Technical support quality				
C9	Missed appointment		S9	Product stock levels				
C10	Late for appointment		S10	Product no longer supported				
Delivery			Quality					
D1	Delivery late (required date)		Q1	Product damaged				
D2	Delivery late (promised date)		Q2	Product out of spec.				
D3	Wrong product delivered		Q3	Product out of date rubber				
D4	Incorrect quantity delivered		Q4	Product out of calibration				
D5	Delivered to incorrect address							

Table 6.5  
*Customer Complaint Codes Matrix*

Table 6.5 displays the customer complaint codes matrix that complaints can initially be categorised within. The code matrix has been designed to be expanded where applicable to take account of any issues that individuals of the organisation may encounter in the future. Through the outcomes of Figure 6.11 and Table 6.5, the initial visual design was then created. The models that were created at this stage were designed to be used to communicate key ideas to any prospective information systems developers and were the main reason for their construction. This is argued as important, especially if any prospective developer is to enter the complaints/concerns community of practice (cf. Wenger, 1998) with participants of the team. An example of the first model can be seen in Figure 6.12 and draws on the outcomes of the previous models.



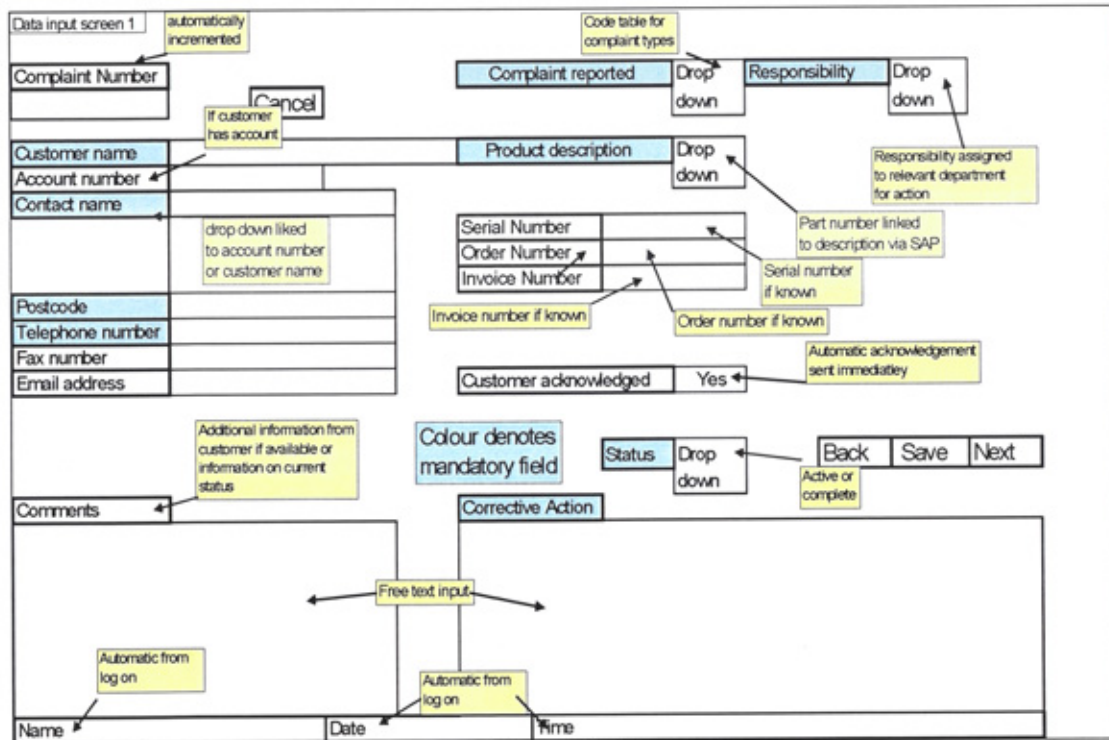


Figure 6.12

*A Visual Representation of how an Information System Application could be Designed*

Figure 6.12 demonstrates one of the models created to show any perspective information systems developers how an envisioned technological solution could be developed, in line with the EDP manager's request. The remaining three models along with all of the flow models and customer complaints code matrix can be seen in Appendix I. This is seen as the end of stage 4 of SSM<sup>XL</sup>. From the work undertaken in stage 2, a systems perspective is argued to be undertaken in stage 3 to highlight where a boundary should be drawn around the project through the outcomes of Table 6.3. Through Table 6.4, focus is clearer regarding what a solution would need to comply with. Further modelling was undertaken based on current procedures for handling complaints, where they existed, and where processes did not exist, they were highlighted and included within the flow models. Finally, a vision emerged of how a technological solution could be designed if the customer complaints 'system' was created. All of the information created at stages 3 and 4 needed to be compared with the work undertaken at stage 2, to make sure what is being proposed will solve the problem of customer complaints. Upon comparing these models, senior management decided that the project should take a slightly different focus.

**6.5 Comparing the Models – Stage 5 Comparison of 4 with 2**

At a customer complaints meeting held on the 10<sup>th</sup> January 2004 (not attended by the researcher), the models were declared complete by the team in a reflection of what was undertaken. As mentioned however, at the end of section 6.4.2, senior management had deemed the project an important project, but in early January decided that the current title of the project (The ‘Customer Complaints Management’ Project) was not suitable. Senior management decided that the project should be re-named The ‘Customer Concerns Management’ Project. The change in title was aimed at changing all individuals (both internal and external) attitudes, due to the term ‘complaint’ conjuring up negative connotations whilst a concern would not (Small, 2005). It was stated the change was designed to try and alter individual’s mental models (cf. Senge, 1990). This change in language is important to note, as the work that has been undertaken focused upon complaints, therefore, would the ‘system’ that was being designed be suitable for solving concerns. It was hoped that the AIM Venn diagram (see West, 1995) worksheets, and rich picture development, had opened up a more focused perspective to take ‘concerns’ into account, as well as allowing the dialogue and language developed to tackle this change. Along with this change in title, individuals were moving into the new building that had been constructed. How the resulting change therefore, may effect the communication of team members was unknown on issues associated with the project, as they are more spread out than they ever have been. With communication highlighted as a problem in the first place, the resulting change may have little effect on the project anyhow.

According to Checkland and Scholes (1990), stages of Soft Systems Methodology can be revisited if it was deemed necessary. As SSM<sup>XL</sup> incorporates the main philosophies of SSM, stages of the SSM<sup>XL</sup> framework should also be revisited. The team however, emphasised that the models created were still suitable. The models that were created at stages 3 and 4 needed to be compared to what was uncovered at stage 2. This comparison was not undertaken in a formal way due to the time – pressures the team were now under. All team members as co-researchers considered the models developed in stage 4 as able to tackle the many perspectives that came out in stage 2.

The models demonstrate current and future ways a concern could enter the organisation, based on where individuals work and how customers contact individuals within BreathCo. Through the many differing opinions of what a complaint is, or now a concern is, the code complaint matrix was deemed to cover all of these aspects. The proposed 'system' is mainly aimed at external customers which most of the team members deemed were more important. The models were envisioned to be able to be expanded to take into account any internal customer issues regarded as important in the future. It is considered that due to the participants using their own tools and frameworks, with some help from the researcher in the early stages, the learning that was achieved was more focused. This can be argued as more emphasis has been placed on generating learning, in comparison to working around a methodology, which in turn has allowed participants to make more suitable changes. An ISA therefore, was proposed as required; as once a concern has entered the organisation, a requirement is for it to be logged onto a database, where a proposed corrective action can be initiated whilst informing the customer of the current progress. The concern can then be forwarded onto another individual within any department if necessary. All the information is stored in the database and can be retrieved. This retrieval allows all concerns to be monitored, reports to be run, and other analysis to be performed. The logging of the concern and subsequent management was not happening within BreathCo previously, and this was argued to solve many of the issues that emerged. As all team members agree with the models, it was now up to the team to try to make changes. The first step in this process was to identify and select a partner organisation to undertake the 'hard' development of the technology, now it was deemed as a requirement in the solution.

### **6.6 Making Changes – Stage 6 Feasible and Desirable Changes**

The focus on a technological solution started at the beginning of the project at stage one, and grew greater during stage two (Small, 2005). It was only at this stage that a language upon debating a technological solution could be created (Small, 2005). The making changes aspect of the project (stage 6 of Figure 6.2) started at the beginning of February 2004 (see Figure 6.1). Upon regaining access to the organisation, the co-operative element was brought back to an A/D (Researcher Full, Subject Full / Researcher Full, Subject Full) aspect with the researcher joining the co-researchers. At a meeting with the customer services manager held in February 2004, a number of



points were recorded. Firstly, the customer services manager still argues the project is progressing slowly. The lack of meetings since Christmas (two in total) however, were due to a number of employees taking holidays or being away on business for BreathCo (Researchers Diary, February 2004). Whilst this was a problem, if the lack of meetings was put down to other issues, the work of Bandura (1986) could have been used to investigate this. As the environment that the project was being conducted in was believed not to be right, an attempt to correct this was made when holidays and other business reasons had passed. Another point relates to the EDP manager. When talking to him informally, he was adamant that the information system would be developed by a partner organisation, even though no formal decision had been taken, and expertise was available in house to implement a Lotus application if required (Researchers Diary, February 2004).

As a presentation from SAP had commenced earlier in the project, an information systems developer from a private company that creates Lotus notes based solutions was invited to the organisation by the EDP manager to meet the team. The EDP manager selected this company (now referred to as Info-Tec), as they had undertaken a project previously at BreathCo and therefore had demonstrated the quality of their products. The project team discussed with the information systems developer the main themes of the project, as well as the specialist demonstrating his knowledge of the types of projects similar to this one. This could be seen as the developer entering the complaints/concerns community of practice (COP) (cf. Wenger, 1998). Action was taken to implement an ISA with Info-Tec. The early meetings can also be perceived as the start of initiating a formal discourse that allowed a vision of how the ISA would be created. Info-Tec was identified as more suitable than SAP, as firstly, the ISA would be designed specifically for BreathCo, and not be an 'off the shelf' solution like SAP would supply. Secondly, the costs of the two solutions were very different, with the SAP solution being a lot more expensive. Even though cost would be an issue for senior management, this was not an issue for the project team, but they still considered that the Lotus solution would provide more value to the individuals of the organisation.

The project leader presented the justification and the work so far to the senior management. Senior management approved the project and agreed to meet the costs.

Upon gaining project approval, it was decided that the size of the overall team undertaking the implementation aspect of the project should reduce, now that the main problem area had been explained and a solution proposed. It was agreed that to undertake the implementation, the reduced team would comprise of the main project leaders (the Quality manager, the product performance manager, the customer services manager, and the 2<sup>nd</sup> customer services team leader) as a solution has been identified and it was now left to them to implement the planned solution.

### **6.7 Identifying and Implementing a Solution – Stage 7 Action to Improve the Problem Situation**

Now the Lotus solution was identified, in conjunction with the information systems developer from Info-Tec, it needed to be implemented and brought into the organisation. This is stated as the final stage of SSM<sup>XL</sup>. The implementation of the ISA through a prototyping approach was discussed, where a version of the technology would be sent to BreathCo and tested by the now reduced team. The developer at Info-Tec's office could then implement any improvements based upon the outcomes. This firstly, allowed the project team to still participate in the testing and implementation of the technology. Secondly, undertaking the prototyping approach allowed the information systems developer to learn about the models developed, how they are envisioned to relate to BreathCo, and the problem of complaints, as well as the dialogue and language that has been created around complaints/concerns. Following on from the initial meetings with the information systems developer, a refined specification was developed by the team, which needed to be and was met by the developer. This specification can be seen in Table 6.6.

Accessible offsite by Sales Representatives for input and status
Accessible offsite by Product Managers for input and status
Accessible offsite by Service Engineers for input and status
Accessible offsite by Training Officers for input and status
Accessible offsite for Senior Managers and technical personnel for input and status.
Data input screen to be user friendly and uncluttered
Responsibility escalation to be understood easily
Links to SAP database for product part numbers and descriptions
Dropdown menus for codes signifying complaint type
Dropdown menus for codes signifying failure type
Dropdown menu for assigning investigation/corrective action responsibility
Tables for dropdown menus to be editable and expandable
Ability to attach documents such as: Storyboards, invoices, P.O.D.s etc.
Data stored and retrievable for: <ul style="list-style-type: none"> <li>Current status report</li> <li>Trend analysis by business sector</li> <li>Trend analysis by customer</li> <li>Trend analysis by failure type e.g.: technical, delivery, quantity , response time etc.</li> <li>Trend analysis by product</li> <li>Management report</li> <li>Commercial report</li> <li>Technical report</li> </ul>
Data to be exportable to spreadsheets
Search facility for: <ul style="list-style-type: none"> <li>Failure by customer (drop down menu)</li> <li>Failure by account number (drop down menu)</li> <li>Failure by type e.g.: technical, delivery, quantity, response time etc.</li> <li>Failure by product</li> <li>Failure by batch</li> <li>Failure by serial number</li> <li>Complaint number</li> <li>Carrier (transport)</li> <li>Order/Invoice number (validated against SAP)</li> </ul>
Customer acknowledgement if “Yes” then option for Hard copy or Email.

Table 6.6

*Customer Concerns Management Specification*

From the initial contract being given to Info-Tec, the information systems developer spent the remainder of February and all of March 2004 producing the first version of the customer concerns technology. Upon completing the contract, Info-Tec would transfer the ISA from the company’s server over to BreathCo’s, who would then have full ownership of the technology. BreathCo would then have implemented an ISA that will solve the problem situation of customer complaints/concerns. This can be considered as the completion of stage 7 and SSM<sup>XL</sup> overall. The researcher could now

exit the organisation and write up the research. Implementing this solution could have been undertaken in a variety of ways, and this could provide learning opportunities for all co-researchers, as well as taking into account how participants of BreathCo could use technology to its advantage. What was of interest was firstly, would the designed ISA, using the thinking built into SSM<sup>XL</sup>, be useful for other individuals who will use the technology. Secondly, how the reduced project team would tackle the challenges that would lie ahead, in trying to leverage the benefits envisioned, was also of interest. For example, would processes that other authors have used (e.g., Wilson, 1984 and the Maltese cross) in conjunction with SSM add value, as well as incorporate theories of the learning organization? Or would they hinder the implementation? This cycle of the research needed to be undertaken.

Leading on from the initial meetings where the team first met the information systems developer, a more focused discussion was undertaken on how the ISA should be implemented through the models the team created. A meeting was held with the project leader at the end of April 2004 about staying on in the team to help with the second phase of the project. The project leader discussed the request with other members of the team with all members in agreement. The second part of the project was split into two parts, firstly, testing the proto-type and making recommendations. Secondly, developing a training package that would be used to train other individuals within BreathCo. Both these phases were considered to be able to be identified through the theories of learning argued for. The project team now consisted of the Quality manager, the product performance manager, the customer services manager, the 2<sup>nd</sup> customer services team leader, the information systems developer and the researcher. It should also be highlighted that firstly, during this part of the project no formal framework of ideas (see Checkland, 1991; West and Stansfield, 2001) (such as SSM<sup>XL</sup> of Figure 6.2) was constructed. This phase of the project was conducted in a pure inductive form. Secondly, referring back to Table 6.1, this stage of the project was conducted in an A/D perspective (Researcher Full, Subject Full / Researcher Full, Subject Full) as both the researcher and other team members could construct the training in any format that was considered to accomplish the task.

### 6.8 Training

As demonstrated in Figure 6.1, developing the training aspect of the project along with implementing a useable technology took from April until June 2004. The final version of the ISA was finished at the end of June, whilst the training of BreathCo employees commenced mainly throughout July and August 2004. It is important to take account of how the training was constructed and undertaken.

#### 6.8.1 Focusing upon Issues Relating to the Information System Application

The training was to be constructed in particular relation to the ISA being implemented. Screen shots could only be taken for inclusion in a training manual when the team agreed that the revision of the technology was at an acceptable level. Along with developing the training package, a presentation on the work completed so far was required for senior managers. This was scheduled for the middle of May 2004, and was to be conducted by the project leader. Potential problems brought to light so far relate to potential users attitudes in using the ISA. The project leader stated individuals concerns were along the lines of *“you expect me to put in the software a complaint about me”* (Researchers Diary, April 2004). This thinking was further emphasised through working on the project in May 2004. The 2<sup>nd</sup> customer services team leader admitted that some individuals in customer services were unsure what the project would mean for them (Researchers Diary, May 2004). The training will not only serve to demonstrate how to use the ISA, but to convince users of the benefits they, and in turn, the organisation can receive from using the technology frequently and correctly. This focus reflects the work of Mumford (1995) as a requirement on focusing upon the socio-technical issues and not just the technology solution.

#### 6.8.2 Design and Implementation of the Training Session

A follow up meeting held at the end of May 2004, further refined some of the issues highlighted during April. The training session had been booked in the conference room in the new building, as the room has network capabilities. A representative from BreathCo's computer department, and a representative from the human resources department, were also present at the meeting. The individual from the computer department was required to help locate any spare computers that could be used for the training, as well as check the network access in the conference room.

The human resource individual was required to inform the individuals short-listed for the training when they should attend. It was interesting to note that individuals would only find out about the training two-weeks prior to attending the training course (Researchers Diary, May 2004). With only a short time frame from being informed to training, how employees would react to the perception of the project and the training was unknown. From the completed training manual, screen shots would be incorporated into a power point presentation, so that trainees could be talked through how to use the ISA. Once these tasks were completed, a practice-training session could be undertaken to test how the sessions would work. The team would have six-weeks from the meeting in May 2004 to finalise all of the plans (Researchers Diary, May 2004). The training sessions were designed with Bandura's (1986) and Vygotsky's (1978) work in mind. For example, where the training was undertaken, how it was undertaken, who was present and in what capacity, were all issues considered.

The final CCM meeting was held on the 25<sup>th</sup> June 2004. All points raised at the past two meetings were met. A practice training session was held the previous day to test how the sessions would run. Overall, the practice training session was a success with some minor points needing re-working (Researchers Diary, June 2004). There were some minor problems with the computers that should be corrected before the training commenced in about two-weeks. All that was left to undertake was the training programme. The team leaders were due to meet senior management to demonstrate how the training would be conducted. A follow up analysis was planned to be conducted after a couple of months of the technology being implemented. This analysis would be led by the researcher, which was agreed by the team.

The training sessions were set out as shown in Figure 6.13.

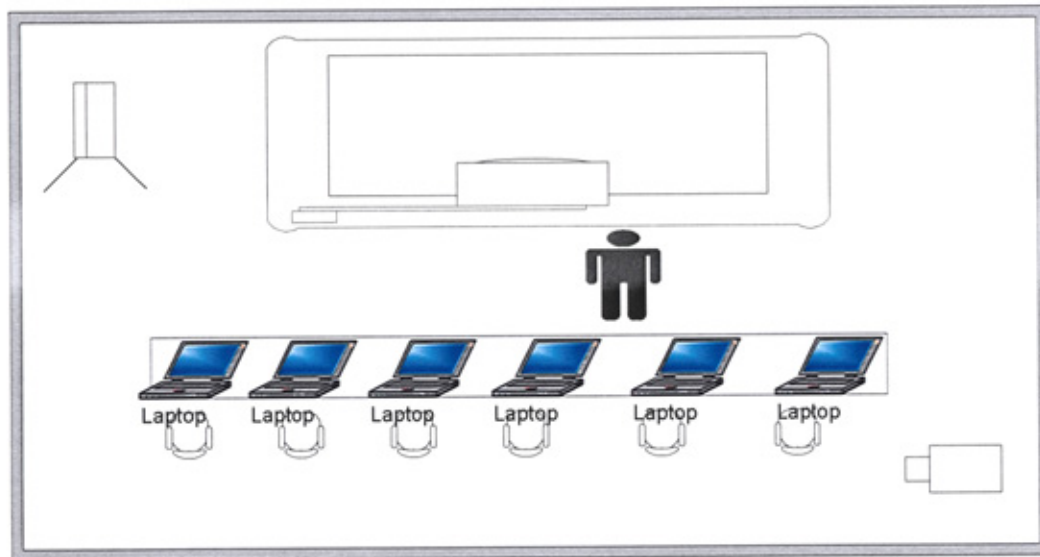


Figure 6.13  
*The Set up of Each Training Session*

Figure 6.13 demonstrates that each trainee would come and sit at one of the laptops which had the technology installed. As well as the laptop, each trainee could also see the white screen where the presentation would be shown. The trainer conducting the session would stand in front of the white screen so all trainees could see both the screen and the trainer. A video recorder was set up in the corner to attempt to capture the dialogue as set out in the methodology. The training timetable was agreed to take a two-phase process. The first hour would be used to demonstrate how to use the technology through the power point presentation (Small, 2005). A question and answer session could then be held so any trainees could put forward any concerns or other questions that they may have, that were not addressed. These questions would then be written on a flip chart and could be disseminated to all trainees after all courses were complete. The second hour was more practical, as trainees were able to practice entering concerns onto the laptop they were sat in front of, through using a training card that was constructed from actual concerns BreathCo had received (Small, 2005). Once a trainee had completed the course, the training Lotus notes tile and the tile that contained the technology, were placed onto the trainees desktop, so they could start inputting any concerns they received. Each trainee also received a training manual they could refer to if required.

Video sessions were recorded from the camera shown in the right hand corner of Figure 6.13. All trainees were informed at the beginning of their session and had the

option not to be videoed. Out of twelve training sessions that were conducted, only one session contained an individual who did not want their session recorded. Eleven sessions were recorded in total. The purpose of video recording each session was to try and capture any dialogue that trainees created either with the trainers or with other trainees at the session. It was believed that video recording, would allow the identification of dialogue over other talking that would also be heard. A regular Dictaphone may not have allowed this kind of recording, as it would be difficult to identify who was talking to whom.

### **6.8.3 Training Session Questionnaire Outcomes**

At the end of each training session, all trainees were issued with two questionnaires. One questionnaire was issued through BreathCo's human resource department as part of each individuals training record. The second questionnaire was developed by the researcher and issued by the team (see Appendix H, Section H.1). Each questionnaire was completed before leaving the training room. A total of sixty-three (N=63) responses from the first twelve training sessions was collected. Other training sessions were conducted for individuals who could not attend the original sessions. These extra sessions were not videoed or questionnaires administered to them, as the project leaders required some feedback as soon as possible.

Through each of the three sections of the questionnaire (general concerns issues, perceived attitudes to the concerns technology and the perceived benefits), a number of statements were given which trainees had to give their opinion on. The opinions ranged from 'strongly disagree', 'disagree', 'agree', and 'strongly agree' as a four point Likert scale. The questionnaire contained 14 statements in total with a space at the end for trainees to add any comments about the technology, or the training, that were not addressed.

A full analysis of the questionnaires was undertaken and fed back to the project team through a formal report. The summary of the findings included in the report can be stated as:



- Half of the individuals regularly receive concerns, whilst just as many do not, and equal numbers of individuals find that concerns take up a lot of time compared with concerns that do not.
- Individuals are also divided equally amongst those that receive the same concerns regularly with those that do not.
- Similarly, all individuals were divided in stating that the company deals with concerns in an ad-hoc manner.
- What most individuals did agree with is that if all concerns were made visible corrective actions could be put into place, which the customer concerns technology can be classed as one.
- A majority of individuals regard concerns are good for the company with a high frequency strongly agreeing.
- The attitude towards the new concerns technology shows that individuals considering they will be available to control the content of their job for dealing with concerns through using the ISA.
- Individuals also state that the ISA will help them identify projects they could undertake themselves, along with participating in joint learning activities with suppliers and customers; as well as communicate knowledge to all levels of the organisation.
- The final section of the questionnaire found that firstly, the customer concerns technology is perceived to help improve an individual's function and identify training needs.
- The customer concerns technology is also perceived to allow individuals a place to learn and create knowledge.
- The overall opinion, from the individuals that answered the question on how long it will take to see any value from the ISA, is that the customer concerns technology will bring value almost immediately.

What can be taken from this analysis is that half of the individuals receive concerns as well as concerns taking up a lot of employees' time. If concerns are being received and they are taking time from employees, it is important to assess, along with other issues, if the ISA designed and implemented is helping employees or not. This evaluation starts the formal analysis undertaken in the next chapter.

**6.9 Post Project Follow up**

Since the initial training week in July 2004, and by the end of August, all identified employees had completed the training session. From September 2004 until November 2004 (see Figure 6.1), the ISA started to be fully used by employees. A follow up analysis was conducted over December 2004 and early January 2005. Before this evaluation was conducted (undertaken in the next chapter), the team focused on a few other issues in relation to the information system.

**6.9.1 Refining the Information System Application**

Now that the ISA had been implemented into the organisation, a further focus on refining the reporting functions within the technology was undertaken. A meeting with the information systems developer from Info-Tec took place at the end of September 2004. The meeting was also attended by the main project team (including the researcher) and an employee from the purchasing department. The purchasing department employee attended the meeting to investigate the possibility of linking the concerns database with a Microsoft Access database, the purchasing department currently uses. The developer seemed to think it was possible and a further meeting to discuss the expansion was scheduled at a later date.

The Quality manager further discussed the project evaluation and the types of information the team would like to know, including how employees were finding the ISA, and how often they were using the technology. Before these interviews were to commence, the reference to BreathCo's GREAT philosophy had been noted throughout the project and within other areas of BreathCo's operations. As this was still an unfamiliar aspect, but a cultural part of BreathCo, two interviews were arranged with the product performance manager and the 2<sup>nd</sup> customer services team leader. These two individuals were selected as they were trainers of the programme to other individuals within BreathCo.

**6.9.2 The GREAT Philosophy**

The interviews concerning the purpose and meaning of GREAT conducted with the product performance manager and the 2<sup>nd</sup> customer services team leader commenced in early October 2004 (see Figure 6.1). Both interviews lasted for around 20 minutes and provided a useful insight. The main purpose of these interviews was to find out

what GREAT stood for, and the purpose of using tools and processes related to the programme. Undertaking such an investigation may go some way to taking into account how commensurable SSM<sup>XL</sup> developed could be, if GREAT tools were the processes of choice or culture. Two networks were constructed in ATLAS.ti to identify what GREAT stands for, as well as explore the confusion that surrounds the process. These networks will not be displayed in this chapter but will summarise the data found.

Both interviewees are unsure exactly what GREAT stands for, but it is recognised as an initiative/process relating to helping individuals improve the organisation! Further outcomes from each interview are listed below:

- Both interviewees did not think the process was being used fully. The product performance manager considers it is a 'buzz' word, whilst the 2<sup>nd</sup> customer services team leader only considers one aspect of the process relating to problem solving as consistently being used. The product performance manager also states storyboards as a tool consistently used.
- The product performance manager does not know how GREAT is officially organised as he has not seen an official GREAT process!
- GREAT was developed at the parent company and initiated to all BreathCo sites around the world. The process is fairly new, as it was only introduced two years ago.
- Both interviewees affirmed GREAT tools are supposed to be used when undertaking projects within BreathCo, but offer the perspective they may not always be used.
- The 2<sup>nd</sup> customer services team leader regards that GREAT will apply to the concerns technology through the reports that are produced, whilst the product performance manager conveys that individuals are just capturing data and not wanting to improve from the output the ISA can produce.

Through the findings uncovered relating to GREAT, it is surprising to find that a process that is supposed to be used on a worldwide basis is not fully understood. The CCM project did use some of the GREAT processes (such as Action Lists see

Appendix G) and a storyboard has been written for when the project is officially signed off. If what the product performance manager argues is happening, in relation to employees just capturing data and not wanting to use the output to improve is correct, it could lead to what Zuboff (1988) has termed as automating. The plan for the concerns technology was to help people informate (cf. Zuboff, 1988) if they could see weaknesses within the organisation. The evaluation carried out in December 2004 and early January 2005 also wanted to explore these issues.

### **6.10 Discussion**

Having undertaken the rich description associated with the customer complaints/concerns management (CCM) project at BreathCo, a number of issues need to be drawn out. By using the SSM<sup>XL</sup> framework to help explore the problem situation and enhance the learning of individuals, it was discovered that communication and departmental co-operation emerged as current problems for BreathCo. Whilst these issues were highlighted, it was unknown if this could be attributed to the culture of BreathCo or due to the way the organisation was structured. Identifying issues such as these could be attributed to using the SSM<sup>XL</sup> framework and allowing learning to be undertaken about the organisation. The SSM<sup>XL</sup> framework however, has been designed to enable more focused learning from the participants who also use the framework. With the identification of the customer complaints/concerns management project, more learning was generated at stage 2 of the framework when it came to focus the project. With the participants co-opted onto a team to tackle complaints/concerns, the focus of expressing 'complaints' was undertaken. Whilst the participants attempted to brainstorm what a 'complaint' was, it was the processes (e.g., the appreciative inquiry methods Venn diagrams (see West, 1995), rich pictures and interviews) that were suggested and carried out by the researcher that helped not only the participants learn about the problem situation, but allowed the researcher to further learn about 'complaints' and the organisation itself.

The main limitation of the SSM<sup>XL</sup> framework so far, is the reluctance of participants to make time to learn about the framework and the processes that the framework can include. This can therefore be a limitation of using the SSM<sup>XL</sup> framework in future projects. Following on from this limitation, formal root definitions and conceptual models were not constructed, so it was not possible to fully reveal the full framework.

Whilst attempts were made to help focus the participants on modelling in ‘systems’ terms, taking control of the project would violate the adopted methodology. The participants however, decided that the modelling would be undertaken using formats all participants were familiar with. Through the participants constructing and carrying out the information retrieval framework (Table 6.3) and the technology wish list (Table 6.4), a human activity system (HAS) is argued to have been constructed. Whilst no formal SSM root definitions, CATWOE’s (even though they were undertaken by the researcher and given to the team), and conceptual models were formally used as a process of the framework, this was argued in Chapter Four as one of the differences of SSM<sup>XL</sup>. At the ‘systems’ stage of the SSM<sup>XL</sup> framework, what is produced has to enable all participants to contribute; allowing debate to be undertaken, and not closing off the exploration of the problem situation too early by forming a unifying definition and model. Collecting, discussing, and developing a language on complaints, led to modelling potential systems from the perspective of flow models (Figure 6.11). Whilst not a formal SSM conceptual model, the approach did focus on the human activity system and what processes a potential solution to the problem will need to encompass; as well further form a boundary that the ‘system’ will be defined by. It is argued that adopting such an approach allowed further exploration and focus to be placed on the problem situation, and enhanced the learning available to all participants of the team.

By using the SSM<sup>XL</sup> framework in this way, the comparison of the models to stage 2 were deemed suitable, even though the change in language of the project may have required stage 2 to be revised. By developing a language around complaints and concerns, when it came to making changes, the language focused more strongly on a technological solution even though these participants were not information system developers or specialists. Undertaking the processes in this way allowed the team to implement the most suitable solution, through learning about the problem situation. Whilst the SSM<sup>XL</sup> framework could be argued to have been used in more of a ‘mode 2’ approach as a way to think about the problem situation, a more focused learning approach could be said to have been achieved. What came out of the final stage of the SSM<sup>XL</sup> framework was the proposed implementation of a Lotus Notes database.

**6.11 Summary**

This chapter has given an overview, or provided the rich description on the customer complaints/concerns management (CCM) project. From a two-week observation conducted in August 2003, the customer complaints management project was identified as being suitable for this research. To accompany the SSM<sup>XL</sup> framework, some of the project was controlled through BreathCo's GREAT process using action lists created at meetings and a storyboard relating to the project. GREAT was found to be linked to organisational improvement with the problem solving tools used the most.

The first problem found was that GREAT is not a form of project management, neither is the process fully understood. The second problem was that participants liked to use processes associated with GREAT. As a consequence the systems models produced drew heavily on familiar processes the participants are used to. As the SSM<sup>XL</sup> framework was not made explicit, the models created included an information retrieval framework, a technology wish list, and flow models on how customers can currently contact BreathCo and how this can relate to an IS. While processes incorporated into the SSM<sup>XL</sup> framework were used (e.g., rich pictures, AIM, and system definitions) these were primarily led by the researcher but no formal root definitions, CATWOE's or conceptual models were constructed. The models developed by the participants formed the basis the ISA was designed on. In the formal analysis, it therefore needs to be focused upon how successful the framework still remains even when excluding the formal modelling aspects of SSM<sup>XL</sup>.

This chapter is the first aspect of the project exploring the design of an information system application through use of the SSM<sup>XL</sup> framework. An attempt has been made to emphasise while SSM<sup>XL</sup> has been used, this was through more of a 'mode 2' perspective (as a way to think about problem exploration and IS design). The question of how well the SSM<sup>XL</sup> framework performed, and how good it was in producing the envisioned learning, is now focused upon in the formal analysis in the next chapter.

## Chapter Seven: Learning Outcomes and Analysis from the BreathCo Customer Concerns Management Project

### 7.0 Introduction

This chapter sets out the analysis undertaken in the BreathCo case, and subsequently the learning outcomes identified. Through both cycles, interviews were the primary method used to collect data (see Figure 6.1 in the previous chapter). The analysis draws on these interviews throughout the duration of the project. Diary records, as before, are also used as supporting evidence along with the video transcripts that were used to record aspects of the training. As has been described in Chapter Five, ATLAS.ti has been used to help code and present this analysis. This chapter is organised as follows. The first issue that this chapter begins to address is concerned with identifying the theories of learning argued for in Chapter Three. This is undertaken in section 7.1. On discussing these theories an investigation was undertaken into how the information system application (ISA) was designed and implemented and is presented through a summary in section 7.2. Examining this issue allowed an overall picture to be built up of the benefits, limitations, and other issues participants describe. Finally, and most importantly for this chapter, an analysis was completed upon how successful the SSM<sup>XL</sup> framework was in helping the project team to take suitable action in designing and implementing an information system application (ISA). Examining SSM<sup>XL</sup> will allow the benefits and the limitations of the approach to be considered and this is undertaken in section 7.3.

As pointed out throughout Chapter Five, the data collection methods have been reviewed, selected, and justified. Through the process of depicting the action research strategy, the project can be argued to have commenced in two cycles. The first cycle consisted of using SSM<sup>XL</sup> (this chapter) whilst the second cycle focused upon implementing the ISA to solve the problem of concerns (the next chapter).

### 7.1 Investigating a Theory of Learning

Within Chapter Three, three theories of learning were argued to be applicable when identifying learning activities as they are undertaken by individuals within an

organisation. As a quick review, these theories were Bandura's (1986) social learning theory, Vygotsky's (1978) zone of proximal development (ZPD), and communities of practice (COPs) as developed by Lave and Wenger (1991) and Wenger (1998). Each theory was discussed and argued to be commensurable with each other, which also removed the possibility of missing learning that was being undertaken, if the use of just one theory was considered. All three theories are stated to have been identified through undertaking the design and implementation of the customer concerns management (CCM) project.

In the primary research conducted, different aspects of each theory are argued as having been identified within the interviews and training videos. As the data was being analysed within ATLAS.ti, social learning theory is identified 48 times, learning from entering the zone of proximal development is argued to have been identified 56 times, and participant's learning within a community of practice was coded 52 times. A memo was developed incorporating dialogue from participants to further identify these conditions and this was constructed in ATLAS.ti. Doing this allowed an overview of the learning theories that are considered. The memo provided the first step in exploring the theories of learning. Examples of the learning theories were regarded, as being in use in the first phase of the project, when members of the project team held meetings to discuss and plan future actions in various meeting rooms. These meetings could be observed using Bandura's (1986) triadic reciprocity model on how individuals' behaviours, personal and cognitive factors, and the environment could contribute to the learning being undertaken.

During the training, trainees were exposed to the new technology. Each trainee had the opportunity to ask questions and seek help from the project leaders who were responsible for conducting the training programme, but who also were responsible for designing the ISA. Where trainees could not undertake specific tasks the project leaders were sought out for help. It was through the process of the trainers helping the trainees learn about the ISA, that the ZPD is argued to be present and comprehended. Finally, the project team composition could be explored using a theory of a community of practice (Lave and Wenger 1991; Wenger, 1998) and Vygotsky's (1978) zone of proximal development. The various stages of the project, and theories, are argued to be summarised through Table 7.1.



Stage Of Project	Learning Theory
Designing the customer concerns management project.	Social learning theory. Zone of proximal development. Communities of practice.
Stream lining the team, selecting an information systems developer and implementing the ISA.	Communities of practice. Zone of proximal development.
Training	Social learning theory. Zone of proximal development.
Technology Use	Unknown

Table 7.1

*Learning Theories as they can be Applied to the Customer Concerns Management Project*

Table 7.1 gives a summary of the different stages that the project passed through and the learning theories which are argued could be identified. Whilst not claiming these theories are the only theories to apply, a perspective is offered that valuable learning points can be identified throughout the project. This can be achieved by discussing the processes that took place, and what impact the outcomes may have produced on the project.

It would seem more logical to examine each stage of the project and discuss the theories. It is argued in Chapter Two, that the successfulness of an ISA comes through using the ISA and depends upon how the users perceive the technology (cf. Mumford, 1995, 1996; Stowell and West, 1994). This phase of the analysis focuses upon perceptions and usage. As has been argued, the perceived usefulness of an information system relates to how it was designed and for this project this was through SSM<sup>XL</sup>. This analysis can help uncover issues relating to SSM<sup>XL</sup>, the analysis on the techniques used within each stage of the project, and if they proved successful or not.

## 7.2 The Customer Concerns Technology and its Usage

Since the training was conducted in July and August of 2004, all participants had used the ISA for at least three months. As has been pointed out, the full analysis of the concerns technology and its usage was undertaken but only a summary is presented here. The full analysis can be seen in Appendix J. What can be drawn from this analysis undertaken in Appendix J includes:

- Reports are not being used and therefore not giving the participants the chance to test their mental models (cf. Senge, 1990; Senge et al., 1994) or initiate improvement projects of their own.
- This may be due to the reporting functions being regarded as a management function only.
- The individuals are mainly using the ISA to automate and not informate (cf. Zuboff, 1988). The primary use for the information system by the participants is just the logging of concerns onto the database.
- Most participants do not perceive any value from the information system now, but envision value from the technology in the future. It may therefore, be the project leaders' responsibility to try and take the learning generated from the earlier stages of the project forward.
- One theory proposed relates to greater usage of the ISA coming from front line employees, as they interact with the external customer more frequently and therefore, may get more value from the learning the information system application could produce.
- The language between 'complaints', 'concerns', 'ownership' and 'responsibility' may not be fully understood adding to confusion about entering concerns.
- Learning and communities may be forming through the output of the information system but not within the technology. Increased learning activities could be generated within BreathCo, but these can not be precisely seen or measured.

If all individuals perceive the outcome of the project as providing an information system application that is not suitable, even if the design of the IS was good, the technology can be classed as unsuccessful for BreathCo. The SSM<sup>XL</sup> framework however tried to explore the many different issues to design a 'system' that would be accepted by users, such as the ten participants interviewed, as well as generating learning activities. Two issues therefore, need to be investigated. Firstly, how well the information system application was designed, and the benefits or otherwise of SSM<sup>XL</sup> in achieving this task. Secondly, what can the project team now do to

encourage other employees to further use and gain the benefits that the ISA can bring to their job role, which they are currently not?

***Learning Point:** In order for the benefits of any technology to be reached by individuals of the organisation, the individuals have to interact with the ISA and use it. If individuals are not using the technology, a process may need to be implemented to help manage this process. As individuals are not using the technology as planned, the problems may have resulted, as Argyris (1999) states, through design. These issues also have to be taken into account and revised if necessary. The design process of any ISA therefore could relate to the learning activities that can be achieved from the technology in the future.*

It may be argued that trying to force an ISA upon the individuals goes against what this thesis set out to accomplish. Most of the individuals however state they will get some value from the ISA in the future. The value that is perceived therefore needs to be realised, and it is how this realisation can take place that is important. Along with this issue, what needs to be considered is if the design elements contributed to the current perception of not having much value in the technology. These answers may go some way to developing an approach that can help the participants of BreathCo, and the concerns technology, to build on any learning activities that are hoped to be undertaken during the design phase. It is the design process through use of SSM<sup>XL</sup> that needs to be analysed and will be discussed now.

### **7.3 Analysis of Using the Soft Systems Methodology Expanded for Learning Framework**

Through providing the thick description of the CCM project in the previous chapter, some early thinking was presented. Whilst certain issues were touched upon, it is left to this section to analyse and explore these issues further. This remainder of this chapter is split into a number of sections that focus around the stages of SSM<sup>XL</sup>, before conducting a discussion on what was uncovered from the analysis and concluding with a summary. The sections include:

- Exploring the unstructured problem situation

- Expressing the problem situation using SSM<sup>XL</sup>.
- Learning identified through using SSM<sup>XL</sup>.
- Summary from expressing the problem situation.
- Constructing models through systems thinking.
- Comparing the models and implementing changes.
- Discussion.
- Summary and learning outcomes of using the SSM<sup>XL</sup> framework.

We will now address the first of these issues, exploring the unstructured problem situation.

### **7.3.1 Exploring the Unstructured Problem Situation**

From the two-week observation and early project meetings, a form of dialogue and early language was being developed that would allow the issue of ‘complaints’ to be explored. What was noted is that if SSM<sup>XL</sup> was to be used in this and future projects, either sequentially or by using the most applicable stage, five issues needed to be addressed. These issues, while specifically applying to BreathCo, may also apply to individuals within other organisations that may want to use the SSM<sup>XL</sup>. The five issues identified can be listed as:

- Communication.
- BreathCo’s operations are too slow.
- Individuals fire fighting.
- Focus on information systems applications
- Standard operating problems the individuals of the organisation face.

#### **7.3.1.1 Communication**

The problem of communication within BreathCo was firstly observed during the two week observation. Secondly, this problem was further drawn out through the outcomes of the first set of interviews during October 2004. From coding the interviews in ATLAS.ti (see Appendix F for a full code frequency table); a number of issues were identified. These issues are presented in Table 7.2 below.

Code	Interviewee													Total
	Quality Manager	Repair Co-ordinator	Shipping Supervisor	Receptionist	International Team Leader (CS)	Product Planner	Customer Service Team Leader 1 (IS)	Repair Administrator	Product Performance Manager	Workshop Supervisor	Credit Control Accountant	Product Improvement Manager	Customer Service Manager	
Negative Organisational Effectiveness	4	4	9	1	12	6	4	4	11	3	6	4	10	78
Communication	0	3	0	2	3	3	4	4	2	13	0	10	12	56
Departmental Co-operation	5	3	3	0	3	6	3	4	4	7	1	7	7	53
Organisational Effectiveness	3	3	2	0	8	2	2	0	6	2	2	5	3	38
Organisational Awareness	9	1	8	0	2	0	2	2	5	1	0	3	4	37
Time Issues	8	0	9	2	1	1	2	1	0	4	0	3	4	35
Negative Time Issues	10	3	8	0	2	1	3	1	3	0	1	0	3	35
Resources	9	1	6	0	2	2	3	0	3	2	0	4	1	33
Negative Communication	0	1	4	0	1	0	1	1	1	2	5	0	5	21
Negative Departmental Co-operation	0	2	8	0	0	0	0	1	0	1	2	0	6	20
Positive Organisational Effectiveness	5	2	2	1	1	0	2	0	2	3	0	1	0	19
Project Management	9	0	0	0	0	0	1	0	1	1	0	2	1	15
Information Systems Use	0	1	1	0	6	1	0	0	4	0	0	0	0	13
Negative Information Systems Use	0	0	7	0	1	1	0	0	1	0	0	2	1	13
Senior Management Support	1	0	1	1	1	0	0	0	1	1	0	2	2	10
Negative Organisational Awareness	0	1	1	0	0	2	0	2	0	0	1	0	1	8
Senior Management Empowerment	1	1	0	0	1	1	0	1	0	1	0	0	2	8
Positive Communication	1	1	4	0	0	0	0	0	0	0	0	0	1	7
Negative Resources	3	0	1	0	0	0	0	0	1	0	0	0	1	6
Positive Time Issues	2	0	0	0	0	1	1	0	2	0	0	0	0	6
Negative Senior Management Support	0	1	0	0	0	2	0	0	0	0	2	0	0	5

Table 7.2

*Key Themes Found within the First Set of Interviews*

Table 7.2 presents a number of key themes as stated by participants who were interviewed in October 2004. The highest issue identified, based on how the interviews were coded by this researcher, within ATLAS.ti, was the ineffectiveness of BreathCo. Whilst it may be argued that quantifying certain themes and issues has no value, it is argued trying to obtain a picture of certain problems can be an advantage in starting to use SSM<sup>XL</sup> and explore the problem situation. For example, briefly scanning Table 7.2, negative communication and negative departmental co-operation although not ranking as the highest issues, are also identified as issues of importance. Further, scanning Table 7.2, participants referred to IS usage and negative uses of IS a similar number of times. Most statements about the negative use of IS however, came from the shipping supervisor. What can be theorised from this initial analysis is that ‘communication’ issues may hinder (negative communication) as well as help

(positive communication) the organisation, as co-operation with other departments is required to undertake work, which can result in increased time pressures on individuals within the organisation. To explore this issue further, a memo was constructed within ATLAS.ti. The memo examines the thinking that communication may help as well as hinder individuals within an organisation and can be seen in Figure 7.1.

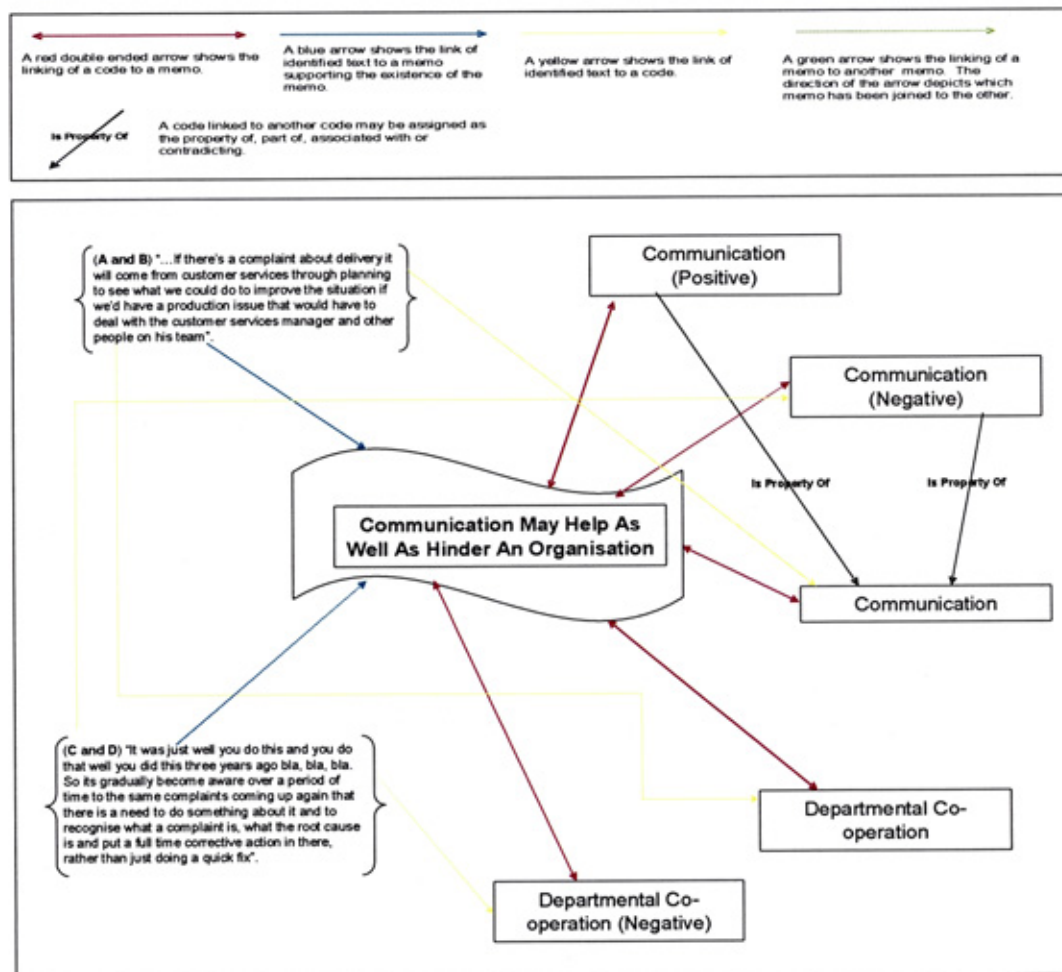


Figure 7.1

*A Theory Relating to Communication within BreathCo*

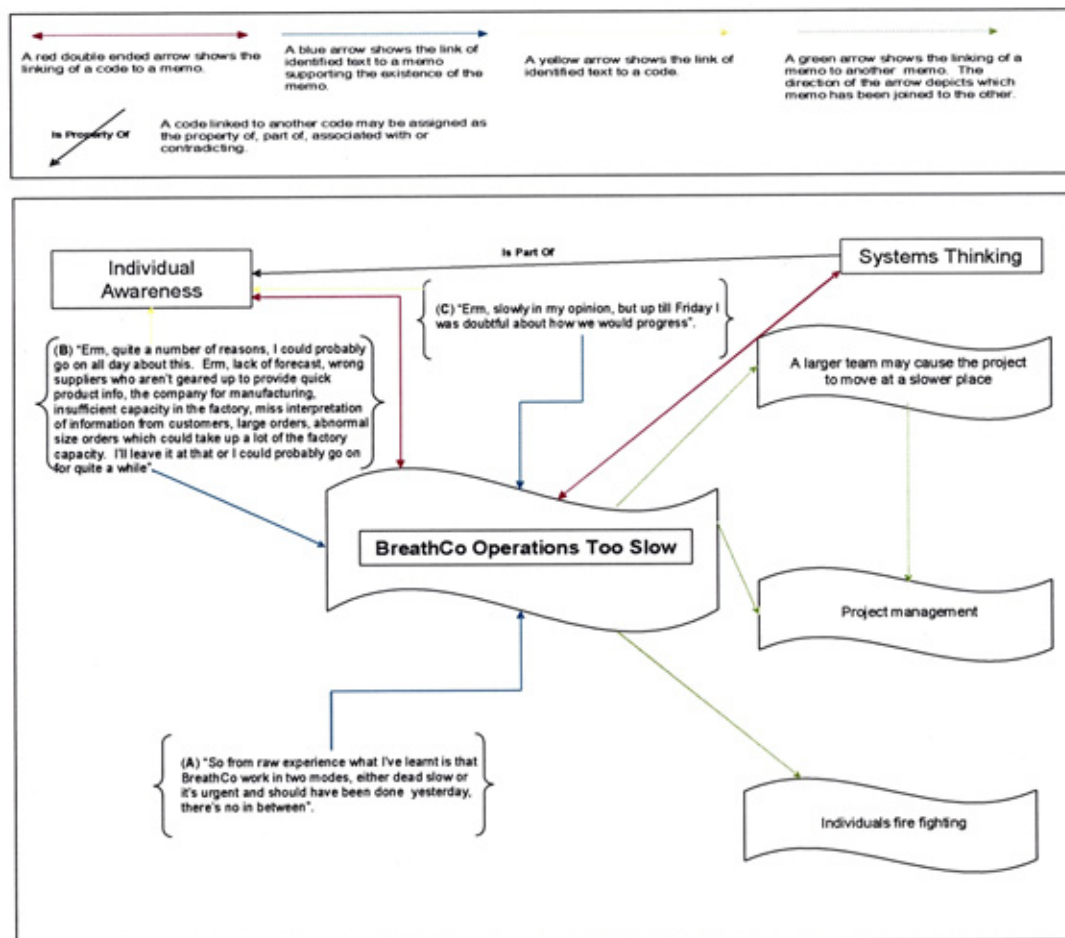
Figure 7.1 displays early thoughts that individuals do not communicate as effectively as they should, which can hinder the operation of an organisation. This is especially prevalent if a suitable dialogue and language have not been established. Problems can relate to blame, shifting the burden, and other problematical processes that Senge (1990) talks about. To support this thinking, Figure 7.1 displays a number of quotations taken from the interviews to support the thinking. The examples are drawn from the product planner (links A and B), and the customer services manager (links C

and D). The codes that are also argued to apply to the thinking that communication may help as well as hinder the individuals of the organisation are also displayed (communication, communication positive, communication negative, departmental co-operation and departmental co-operation negative). The joint links between the quotations should be highlighted to support the thinking as well as the quotations that are linked to a code. Coding and presenting the data in this way was discussed in the methodology. As a reminder of what the coloured arrows mean a small key is provided above Figure 7.1. From examining Figure 7.1, it is considered that these communication problems firstly did not just relate to BreathCo in a general sense, but could be a cause of a concern. Secondly, if the project was to succeed, communication would need to play a part in undertaking the project. Along with the issue of communication, BreathCo operating too slowly was also identified as an issue in limiting how the project could be conducted, as well as in using the SSM<sup>XL</sup> framework.

#### 7.3.1.2 BreathCo's Operation are too Slow

BreathCo's operations are too slow refers to the time it takes for BreathCo to complete specific tasks the individuals of the organisation are required to undertake. If individuals perceive that the use of SSM<sup>XL</sup> would make the project move even slower, the usefulness of the approach may be reduced. This thinking was displayed during all stages of the primary research and is shown in Figure 7.2.

Figure 7.2 displays a number of coded quotations that indicate that BreathCo, at times and for specific tasks, operates too slowly. A quote supporting this thinking comes from the computer department (EDP) manager's experience (link 'A') on how BreathCo generally operates too slowly (Interview with the EDP Manager, December 2004). Another issue was highlighted when inquiring into whether senior management would empower team members to implement any proposed solution. The receptionist highlighted the time it takes for any initiative to be undertaken, "*in my opinion, a lot has been sort of mentioned before, I'm going back years, you know what I mean...*" (October 2003).



Whilst the quotes displayed in Figure 7.2 support the opinion that BreathCo's operations are too slow, the code 'systems thinking' is argued to apply if individuals can identify these and other problems, within the language of 'systems'. Being able to think in this way may allow areas to be identified that are contributing to the organisation operating too slowly, or identify specific problem areas that need to be addressed. Individuals therefore have to become aware of what factors are causing other individuals of the organisation to perform in this way, as well as become aware of other processes within the organisation. Whilst tackling this project, the use of SSM<sup>XL</sup> could enable this task to be undertaken in the future, if the processes adopted within the framework proved useful. This serves to highlight the learning that was obtained through using SSM<sup>XL</sup>. However, how other participants (co-researchers) are able to generate learning activities needs to be investigated.



The code 'individual awareness' as well as the code 'systems thinking' has also been linked to BreathCo operating too slowly. Individual awareness of why BreathCo is operating too slowly comes from the product planner and the product performance manager. The product planner displays his awareness when he is asked about what can cause long lead times (which was uncovered from the AIM Venn diagrams). The product planner's reply is shown by link 'B' in Figure 7.2 (Interview with the Product Planner, October 2003). Other awareness reflecting the slowness of BreathCo comes from the product performance manager as shown in link 'C' (Interview with the Product Performance Manager, October 2003). With the product performance manager's thinking demonstrating awareness specifically in the complaints/concerns project, like other processes within BreathCo, implies that the organisation moves too slowly on operations that need to be undertaken. From the product performance manager and other participants, three other issues relating to methods conducted within BreathCo that may be contributing to the organisations general slowness, are identified. These may inadvertently impact on using SSM<sup>XL</sup>. These can also be seen in Figure 7.2. These memos have been labelled as:

- The size of the project team to develop the complaints/concerns project may be causing the project to move at a slower pace.
- How projects are undertaken within BreathCo may relate to the stated organisational project management guidelines as well as the successfulness of using SSM<sup>XL</sup>. The project management guidelines may relate to the number of individuals that may make up a project team, which is why the memo is linked to the previous memo.
- The perception of individuals constantly being reactive and not being able to be proactive may be causing the organisation to operate at a slower pace than desired.

The final point in the above list will be discussed in greater detail next. The first two points are important but will only be summarised here.

*Size of the project team:* larger teams were stated by the product improvement manager to slow the progress of projects down. Whilst other participants argued the

advantages and disadvantages of teams through issues such as getting participants together for meetings, participants not wanting to contribute to a project, and projects that considered involving the right number of participants. Overall participants concluded teams were essential in conducting projects such as the complaints/concerns project, due to the input from participants who would be involved in any outcome.

*Project management within BreathCo:* the issues drawn out that are related to project management, demonstrated that participants were unsure how projects are usually conducted. What was found was that participants are usually asked to participate on a project because of their experience and what the envisioned outcome is thought to be. The process of project management within BreathCo involves the GREAT process, even if participants are not exactly sure how to do this. From these perspectives, an examination of how the project team was selected for this project was undertaken. The Quality project manager implied that due to a combination of a lack of interest from other participants, and Quality being identified as leading such programmes, they were co-opted to lead this project. Whilst a number of participants believe continuous improvement programmes are the responsibility of the Quality Department, these mental models were not tested. Other issues included how projects can be undertaken in different ways where participants who have knowledge of particular processes are asked to participate. A project team therefore can range in size depending on the project.

#### **7.3.1.3 Individuals Fire Fighting**

Another point that was drawn by observing the in individuals of BreathCo, related to issues of participants consequently 'fire fighting'. The point concerned individuals having to constantly be reactive and not proactive, or to use a metaphor, having to fire fight. If participants are facing such problems, it could restrict the use of the SSM<sup>XL</sup> framework. These issues have been developed in Figure 7.3 below.

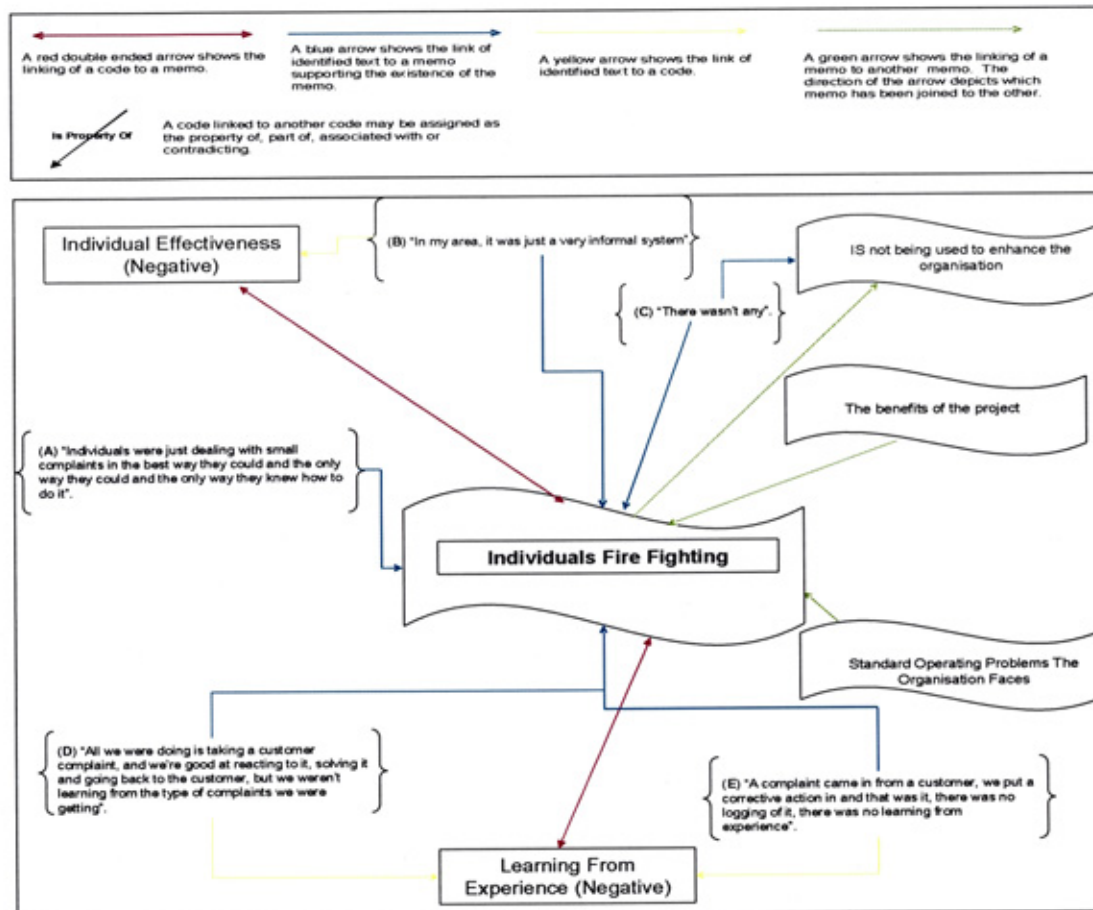


Figure 7.3  
*Individuals Having to Fire Fight*

Figure 7.3 shows the quotes coming from the project development team who were interviewed in December 2004 and January 2005 reflecting on the project. In particular, the quotes displayed come from the 2<sup>nd</sup> customer services team leader and the customer services manager. The 2<sup>nd</sup> customer services team leader reflects on how individuals dealt with complaints previously, as shown by link 'A' (Interview with the 2<sup>nd</sup> Customer Services Team Leader, January 2005). The customer services manager provided a variety of examples that not only supports the thinking that individuals within BreathCo have to be reactive, but also demonstrates that individuals are not learning from experiences, as well as not being effective as possible, due to having to fire fight constantly.

Individuals are considered to spend a lot of their time fire fighting and not approaching complaints/concerns proactively. The procedures currently in place were investigated, including IS. As link 'B' (Interview with the Customer Services Manager, January 2005) and 'C' (Interview with the 2<sup>nd</sup> Customer Services Team

Leader, January, 2005) demonstrates, this was an area that participants needed to focus on. Even though the department has access to a variety of ISA, these are not being used to help with complaints/concerns. The memo of IS not being used by individuals to enhance the organisation can be seen to be linked. On a similar theme to IS not being used by individuals to enhance the organisation; in relation to complaints/concerns, the customer services manager shows the full extent of having to fire fight as shown by link 'D' and link 'E' (Interview with the Customer Services Manager, January, 2005). In noticing this lack of learning being undertaken, it was considered that learning from experience was not being undertaken by individuals within the organisation, which is why the memo has been linked with this memo on individuals having to fire fight. Figure 7.3 also demonstrates the linking of the previous discussion on 'operations being too slow' as well as the benefits of the project if it was to be undertaken. These benefits relate to how SSM<sup>XL</sup> was used and needs to be discussed. The final memo linked in Figure 7.3 relates to the final point for this section on the standard operating problems individuals of the organisation faces.

#### **7.3.1.4 Focus on Information Systems Applications**

A featured issue that constantly was being debated related to constant acknowledgement that an ISA would need to be implemented. This issue however, was being dialogued before exploring the problem of complaints/concerns. For SSM<sup>XL</sup> to succeed, the bias of IS needed to be removed, and communication relating to the project improved, along with the co-operation between departments. If this could be achieved, it is argued SSM<sup>XL</sup> would allow a solution to be presented that took into account the problem situation. This issue was again identified through the product planner (link A) and the project leader (link B) within the early interviews (undertaken October 2004) as shown in Figure 7.4.

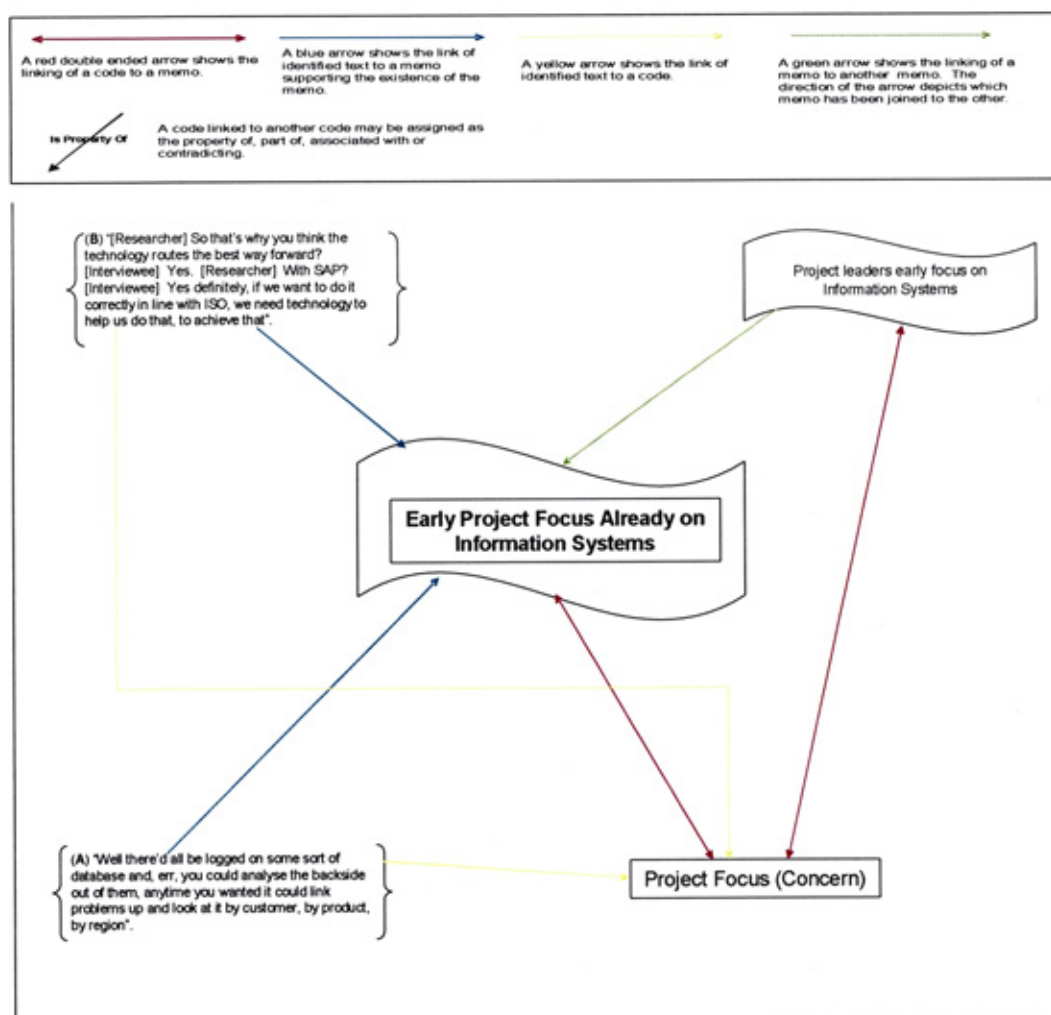


Figure 7.4  
*Early Focus upon Information System Solutions*

From undertaking and drawing out data that demonstrates issues such as communication, identifying that BreathCo's operations may be too slow, individuals having to fire fight, and focusing on ISA solutions too early; could confirm certain mental models that SSM<sup>XL</sup> has to address and overcome. This is important if the framework is going to be useful to participants. This is particularly relevant if action is taken to design and implement an information system application. One final issue was identified that could limit the usefulness and use of the SSM<sup>XL</sup> framework and this related to standard operating problems individuals of BreathCo face.

#### 7.3.1.5 Standard Operating Problems the Individuals of the Organisation Face

A network was constructed (not shown here) that drew out the many issues coded throughout the data collection process that highlights problems BreathCo was facing. The purpose of SSM<sup>XL</sup> is to draw out any issues that are considered to be relevant

about complaints/concerns, so the project team can dialogue and develop a language around the issues that are deemed important. The issue relates to the solution to the problem of customer concerns and is argued to stem from the problems relating to other operating problems. This is posed because if individuals are aware of what problems they currently face, and how these may be solved, it could give a better insight into what potential outcome the project should develop. For example, this outcome could be; to satisfy customers more effectively, and highlight continuing problems the individuals of the organisation face. However, if other individuals are thinking differently, certain points may be excluded and other issues focused upon. The SSM<sup>XL</sup> framework has been designed to help with this particular problem. The problem is SSM<sup>XL</sup> has to be able to communicate these issues to all members of the team. The main data used to investigate these issues were taken during the first round of interviews with some additional reflections coming from the design stage during the follow up interviews.

Through a network constructed (but not displayed here), a number of quotes that not only gave an account of the problems individuals face, which are also making the organisation less effective were identified. It is argued that it is the combination of individual's problems, which is making the organisation ineffective. This ineffectiveness, within an organisation is considered to be associated with the awareness the individuals within the organisation may possess. The problem is that the individuals of the organisation are becoming ineffective, which in turn will not enable an organisation to improve. The examples identified within the network provided details of common problems that are making individuals of the organisation ineffective (e.g., not being able to find certificates to match serial numbers for cylinders, and issues of incorrect data being used which causes errors in departments such as shipping). Examples such as these identified could be addressed through SSM<sup>XL</sup> in exploring the problem situation, which may result in an ISA to help highlight such issues. Whether these issues will be addressed or not is not important. What is important is that these problems are highlighted to other individuals and discussed through a dialogue for this project, so participants themselves can decide the best cause of action to take.

What should be highlighted through this section is that SSM<sup>XL</sup> was going to have to be used with individuals that are constantly facing problems and having to react to problems immediately, as the organisation is too slow. To accompany this slowness, individuals have to contend with other organisational operations, which are causing individuals to become ineffective over a period of time with little learning from experience being recorded. To add to these problems, communication and departmental co-operation are also a problem. Through Chapter Six, an overview of the project was discussed which resulted in the implementation of a technology. This does not necessarily mean the process followed was the best or most suitable, or produced an outcome that was desirable. Whether SSM<sup>XL</sup> helped with these issues needs to be considered while allowing a solution to the problem of customer complaints/concerns to be devised.

**Learning Point:** *In order to use SSM<sup>XL</sup> there needs to be time set aside to use the approaches and techniques the framework has to offer. If this time cannot be found the framework may not be as valuable as it could be. With the many different perspectives surfacing through the un-structured problem situation, a variety of tools (e.g., the AIM and rich pictures) need to be used to help structure the problem situation.*

### 7.3.2 Expressing the Problem Situation through Using the Soft Systems Methodology Expanded for Learning Framework

In association with the issues highlighted in the previous section, a number of areas were also uncovered through using SSM<sup>XL</sup> that related to specifically structuring the problem of customer complaints. These are listed as:

- Who is currently perceived responsible for concerns?
- Perceptions of receiving complaints/concerns.
- Individuals may not want to highlight complaints.
- Not seeing the project as it is.
- General project management within BreathCo
- Selecting the customer complaints/concerns project development team.
- The benefits of the project.

The first four points are issues that needed to be explored and expressed specifically in relation to the project at stage two. The remaining three points related to issues that individuals within the organisation needed to address but were deemed more generic and could apply to other projects. Table 7.3 provides a synopsis of each of the above points that were uncovered.

Issue	Reasons Issue Needs To Be Expressed
Who is currently perceived responsibility for concerns?	If all individuals share the same perspective, the solution may be easily obtained. However, as the project is being conducted because there is not a system to handle complaints, it is likely that each individual may have a slightly different focus.
Perceptions of receiving complaints/concerns.	The project is attempting to solve complaints, but some individuals perceive they do not receive complaints, which could affect the outcome of the project if this thinking is held.
Individuals may not want to highlight complaints.	If complaints are made visible, individuals who have made mistakes may be identified more easily. This may lead to a negative attitude towards the project. If complaints are not highlighted then the individuals of the organisation could find it difficult to improve and satisfy customers.
Not seeing the project as it is.	It seems that even though people can answer questions based on what they think about complaints, they seem to not see the bigger picture. It is unknown if this is due to communication problems, other projects, or people believing that their input will not be taken into account, and that it is left up to other individuals to implement.
General project management within BreathCo	A justification for the project that senior management sign allows a project to be raised as a formal project. The formal project then is allocated a budget. How any project management guidelines will be used therefore, may influence the use of the framework. What seems to be happening is that projects are using GREAT documentation as ways to record the status of a project, but specific project management functions such as how, when, and why project meetings should take place, is left to the project leader(s).
Selecting the customer complaints/concerns project development team.	It is unknown how individuals are assigned to a project. It may have something to do with their job within the organisation and what type of expertise a project may require. This issue can relate to the successfulness of a project. The framework may help focus this task.
The benefits of the project.	If a project is approved there has to be some benefits. It is easy with quantifiable measures but with a project relating to customer satisfaction, the benefits will come from intangibles that are difficult to justify.

Table 7.3

*Issues that were Uncovered through Using the Soft Systems Methodology Expanded for Learning Framework*

Table 7.3 draws out issues SSM<sup>XL</sup> was used to uncover in interviewing participants and observations made. A full network has been constructed to show the connections between these issues and can be seen in Appendix K, Figure K.1. The figure is included as an appendix only, due to its size and complexity.

Figure K.1, Appendix K, was designed to show a complete network of the themes that were uncovered and needed to be expressed. Firstly, it has to be emphasised that the researcher constructed the network and interpreted the issues in this particular way.



Secondly, it is important to note that the quotations that support each point have been removed due to the complexity the network already possesses. What should be noted through Figure K.1, Appendix K, is firstly, the codes that are linked to the memos and each other. Secondly, which memos are considered as linking together should be noted as well as other memos that have already been brought into the discussion (for example, ‘individuals role within the organisation’, ‘use of the technology’, ‘a larger team may cause the project to move at a slower pace’, ‘individuals fire fighting’, and ‘Quality perceived to be responsible for concerns’) with other memos that will be argued to also apply as identified in Table 7.4 below. The codes can be referred to through the code frequency list, that is shown in Appendix F, to highlight the amount of times the code has been identified throughout each phase of the project (the first thirteen interviews relate to expressing and structuring the problem situation within SSM<sup>XL</sup>). Undertaking such a task can indicate the relevance of the code. To support the points (memos) displayed, a number of quotes are attached to each memo (not displayed in Figure K.1, Appendix K), which can also relate to the codes displayed within Figure K.1. The supporting data and perceived codes believed to relate to the memos are explored in Table 7.4 below.

Issue	Data Identified From Participants
Who is currently perceived responsibility for concerns?	<p><i>“If you then bring it down one more step it’s literally everybody should be in control of their own, or should have their own responsibility for complaints”</i> (Interview with the International Team Leader (Customer Services), October 2003). <b>Code linked:</b> ‘Perceived Responsibility For Concerns’.</p> <p><i>“I think it’s basically at the minute, I might be answering a few later questions that are really specific problems for specific departments that are dealt with by specific people”</i> (Interview with the Product Planner, October 2003). <b>Code linked:</b> ‘Perceived Responsibility For Concerns’.</p> <p><i>“It would be the managing director wouldn’t it? In my opinion”</i> (Interview with the Repair Administrator, October 2003). <b>Code linked:</b> ‘Perceived Responsibility For Concerns’.</p>
Perceptions of receiving complaints/concerns.	<p><i>“In the repairs department, you see, there’s something in stock and they want to add bits on, we’re just told that you need that bit on there and that bit on there. But you haven’t got nothing from the customer signed sealed, saying that’s how we want that product. So you might do it the best way you can, send it out and the customer says well that’s not what I asked for”</i> (Interview with the Repair Administrator, October 2003).</p> <p><i>“I mean we don’t have really nasty complaints, so yes I should say I handle complaints, but they are not really what you would call complaints, they’re more niggles I suppose, there not what I would call a proper complaint”</i> (Interview with the International Team Leader (Customer Services)).</p> <p><i>“Yeah, or there’s a best kit quantities, and someone orders one, but he thinks he’s getting one, but in actual fact he’s getting a kit or a packet of ten, or a packet of twenty, but in his opinion was well I didn’t want this quantity, so I’m getting the wrong quantity delivered”</i> (Interview with the Product Performance Manager, October 2003).</p>
Individuals may not want to highlight complaints.	<p><i>“...Disadvantages; that sometimes the problem owner tends to protect their own patch”</i> (Interview with the Quality Manager (Project Leader), October 2003).</p> <p><i>“Probably the profile of the problem that is probably easier to brush them under the carpet and not have the visibility within the company”</i> (Interview with the Product Planner, October 2003).</p> <p><i>“Depends how bad the complaint is, I mean, I would have to go to sort of management if it was out of my control, if it was just something like, you know, I missed a count off or something like</i></p>

Issue	Data Identified From Participants
	<i>that I would do it myself</i> " (Interview with the Repair Co-ordinator).
Not seeing the project as it is.	<i>"Have they got a project going have they?"</i> (Interview with the Credit Control Accountant).  <i>"I don't know in all honesty because we don't get that many, as far as I'm aware, certainly not in our department, we don't appear to have many complaints it appears to be; well the ones that I hear about"</i> (Interview with the International Team Leader (Customer Services), October 2003). <b>Code linked:</b> 'Communication'.
General project management within BreathCo	<i>"All we have to do is raise it as a project and then if the project gets signed off we get a budget, if it doesn't get signed off it stops. So we'll have to, you know, our project management guidelines handbook, we've got a corporate thing that we have to run a project. You've got to have certain gates and progress dates that you've got to go through because what I think we'll do is when we get some idea of cost"</i> (Interview with the Quality Manager (Project Leader), October 2003).  <i>"I think its going in the right direction although possibly not as quickly as many people would like. I still think its probably heading in the right direction because, mainly because it's got the correct people on the team"</i> (Interview with the Product Planner, October 2003).  <i>"I think we're beginning to get the fundamentals of what the problems are right. So yeah its mainly making a reasonable solid base"</i> (Interview with the Product Improvement Manager, October 2003).
Selecting the customer complaints/ concerns project development team.	<i>"Basically because of my drive to identify what is a customer complaint and how is it handled, and that I am not the only one in the company who should be dealing with customer complaints"</i> (Interview with the Product Performance Manager, October 2003). <b>Code linked:</b> 'Project Team Identification'.  <i>"Because of my role within the company as customer services manager, because I'm responsible for the customers; yeah I've got a team underneath us, but to kick the team off they picked me as manager of the department and gradually as it roles out I will be getting other people involved in my team"</i> (Interview with the Customer Services Manager, October 2003). <b>Code linked:</b> 'Project Team Identification'.  <i>"Because I was team leader at the time. We all had to lead a team and I just happened to be in the room and I was allocated that"</i> (Interview with the Customer Services Team Leader 1 (Instrument Specialist), October 2003). <b>Codes linked:</b> 'Job Role', 'Project Team Identification'.
The benefits of the project.	<i>"Well let's say SAP, to install this module they want 100k, which isn't unreasonable cost for them. You've got to look at the benefits. Okay so some of them are intangible benefits that you've got more satisfied customers, you know. It's very difficult to support a justification with intangibles"</i> (Interview with the Quality Manager (Project Team Leader), October 2003).  <i>"Well I think we've got to get this system into place first and until its in place I don't think we can see the full advantages and disadvantages, you know, because we're like in between what's going on"</i> (Interview with the Workshop Supervisor, October 2003). <b>Code linked:</b> 'Benefits'.  <i>"Yes I suppose, yes, you would possibly balance the cost of doing it more against the cost of potential business. So at the moment, probably to the extent there's a sort of feeling that a guy that only buys a couple of quid's worth of stuff therefore it gets a couple of quid's worth of attention if you know what I mean"</i> (Interview with the Product Improvement Manager, October 2003).

Table 7.4

*Quotations from Participants to Support Issues the Soft Systems Methodology  
Expanded for Learning Framework has Uncovered*

Table 7.4 has been used to give an example of some of the quotes recorded in the interviews that need to be expressed formally within stage 2 of SSM<sup>XL</sup>. As has been pointed out the first four points need to be expressed specifically for the customer complaints/concerns project. The remaining three, whilst not specifically relating to this project, may help the participants tackle future issues to help improve the organisation. The issues Table 7.4 and Figure K.1 of Appendix K, try to emphasise for example, includes who is currently perceived to be responsible for concerns. Looking at this issue may provide the solution to the problem of solving customer

concerns that is drawn from the CATWOE and other techniques. This thinking is perceived to relate to either creating a shared vision or not being able to share a vision. Systems thinking is also considered to apply in constructing and discussing the CATWOE. If systems thinking cannot be undertaken, it may relate to not seeing the project as it is. Through Figure K.1, Appendix K, the reader can follow the network around to give an overview of what issues SSM<sup>XL</sup> needs to consider.

The issues in Table 7.4 can now be explored. It was important to present the issues from Tables 7.3 and 7.4 within stage two of SSM<sup>XL</sup>, where the problem of complaints could be more fully structured along with these other issues. From the outcome of stage 2, it was hoped that the modelling that was to be undertaken at stage 3 would be undertaken through a developed language. A developed language would allow a number of issues that may not have been discussable or were being camouflaged (see Argyris and Schön, 1978), such as not receiving complaints or not wanting to highlight complaints to be discussed more openly. Rich pictures and the AIM Venn diagrams were the method used to help undertake the structuring for this project. The document produced has already been referred to in the previous chapter with some examples displayed. How these rich pictures and the AIM Venn diagrams helped structure the problem situation and allow the modelling to commence will now be discussed.

The document was presented back to the project leaders at an informal meeting. The initial reaction was positive, but how successful the document was in generating a dialogue and further creating a language about complaints, needs to be considered. These issues were taken up during the follow up interviews with the main project leaders during December and January 2005. For example, due to the number of individuals that had been involved in the project, and because of the amount of time it had taken to complete, the project participants found remembering aspects of the project difficult. The Quality manager (project leader) was asked how helpful the document produced was in structuring the problem and defining the models. He replied,

*“I can’t remember. [Researcher] a no then, I don’t think I’ve got one with me.  
[Quality manager] well we certainly would have used it Adrian; I know that, I can’t*

*remember the content. [Researcher] it was a brief summary of what each interview, that I found was with some rich pictures, well drawings basically. [Quality manager] oh right. Well we considered all input, so I guess we did do"* (December 2004).

This implies that the team considered a lot of input from a variety of individuals, but due to the amount of time it had taken to complete the project specific issues could not be recalled. The product performance manager believes the research undertaken, including the document, was good, *"I mean from day one I think you've put a lot into it and the research that you've done has been good"* (January 2005). The customer services manager was also positive about the document when he stated,

*"yeah it definitely was, I mean, I used this for explaining it to my people and it was very easy to explain as well, I mean the visuals on it were great and I wouldn't have been able to do anything like this to explain it to them. I mean from a time point of view no one in the company had the time, so that was like something great. But just from the actual input and the wording of it as well..."* he continues *"I mean the way it was put together was totally different to anything BreathCo has ever done in the past for their people, its great, I mean we should learn from this and we should use this as an example for what we do in future"* (January 2005).

Finally, the 2<sup>nd</sup> customer services team leader on being asked about the document produced stated, *"Yeah, I'd say it helped to define the models"* (January 2005). Considering the four project leaders it can be argued that the document produced was taken account of and used. Just how much involvement was had in helping to move the whole process into developing the models is unknown, due to only interviewing the four participants who were involved in the whole process. Interviewing other participants who were only involved in these stages, may have provided different opinions on the document, but that was not possible due to time issues at BreathCo's year-end. All that can be summarised so far is that the rich pictures and the AIM Venn diagrams had helped formalise and structure the problem solution. A review is needed of whether the learning processes that SSM<sup>XL</sup> hoped to achieve have been successful, in these early stages, before focusing on the modelling that was undertaken.

### 7.3.3 Learning Identified through the Early Stages of Using the Soft Systems Methodology Expanded for Learning Framework

Through using SSM<sup>XL</sup> all three theories that are argued can be seen. For example, senior management handed responsibility for the project to the Quality Department. As the customer services manager explained, the four project leaders (which he was one of) were selected for their experience and have a reputation for continuous improvement. The Quality manager and project leader also emphasised the commitment of some individuals to improve by saying, *“we never really got the formal okay to say right this is a go project, you know, we just sort of used the evidence from the audit as justification to say this has to be done. We never sort of said, there’s a need...”* (December 2004). These individuals, based on a presumption they considered as important, started work on improving the situation. This is argued to be an element of a community of practice as reviewed in the literature. These individuals could pass on knowledge and experiences to other individuals who were co-opted into the community through the zone of proximal development (cf. Vygotsky, 1978).

All of the project leaders, and other members of the project team during the exploration and design stage (using SSM<sup>XL</sup>), were more senior individuals within the organisation, such as managers and team leaders. Each team member had expertise on areas of the organisation that would be difficult for other team members to identify and be knowledgeable of by themselves. For example, the product planner had extensive detail of why long lead times may occur within the organisation, which could cause concerns to a customer. Through the AIM Venn diagrams and rich pictures, these issues were highlighted so the product planner could help other team members learn how these issues are, or are not, relevant to the project. When constructing the models, it is these issues and other issues that need to be considered and discussed. For example, the project leader believes that every concern should be acknowledged. Team members from the customer services side however, were aware that not all customers had an e-mail account. The project leader was able to learn through the customer services team members, that acknowledging every customer concern, while trying to improve customer satisfaction, may not be a feasible mental model to hold. If individuals are to enter into the zone of proximal development, as

described by Vygotsky (1978), then the individuals need to come together and allow this learning to take place.

*Learning point: Individuals who have knowledge and experience can help other individuals who do not have such knowledge and experience, learn more quickly about issues that are relevant to the area of concerns. This is important if individuals have only a limited time to implement a process. This learning is argued to be taking place in this team through Vygotsky's (1978) zone of proximal development as individuals made other individuals aware of processes and other issues that needed to be taken into account.*

As well as the four project leaders being selected for the experience and expertise they possess, the customer services manager also stated each of the four had a reputation for continuous improvement. The four project leaders therefore, could be argued to start a community of practice (cf. Lave and Wenger, 1991; Wenger, 1998) in relation to complaints/concerns with the intention of improving the organisation. According to Lave and Wenger (1991) and Wenger (1998), communities of practice cannot be formed but have to be maintained through mutual engagement. The project leader stated that project members were invited to join the team and were not forced to do so. The product performance manager added, “we looked at who the main bodies were dealing with concerns i.e., what was the main point of contact for the customer to raise his concerns within the organisation” (January 2005) and therefore they were invited to participate. It can be stated that those individuals whose job was made more difficult, when other individuals within the organisation received concerns were invited. If individuals were not interested in making their jobs easier they did not attend. Using the model of Wenger (1998) demonstrated in Chapter Three, learning about complaints/concerns was where learning was being undertaken. This can be argued through the practice and learning as doing, aspects of the project undertaken by the brainstorming, conducting research within participants own departments, and using the resulting data, as well as the data (the AIM Venn diagrams and rich pictures) collected by the researcher.

As participants came together to solve the problem of complaints/concerns, the community was formed where learning was undertaken by all members of the community. Meaning was attributed to the community through the experiences gained which provided additional insights. These experiences and insights were observed within the community and were presented by members of the community. The 2<sup>nd</sup> customer services team leader demonstrates this point through a changing opinion of the Quality Department,

*“I think they were happy to be involved [the Quality Department] because it has helped them as well, and especially with the product related concerns. But I think they tend to think that everybody just uses them and says, oh we’ll leave it to Quality”* (January 2005).

By undertaking the project, members of the community could see and share problems that other participants had to tackle. From the problems discussed, processes were developed which could be incorporated within a model that could help, and allow learning to be undertaken as part of the experience. The identity of the community could be considered to have formed due to senior management stating the project was a high priority project, which further emphasised the importance of the project to the community and other individuals within the organisation. The pressure to complete the project was unhelpful, but it could be argued that it enacted the other aspects of Wenger's (1998) model further. This thinking was developed as participants had a stronger identity, community, and continued to work and undertake the practice, and consequently the work being produced attributed the meaning. Using the work of Lave and Wenger (1991) and Wenger (1998), the project leaders could be identified at the centre of this community with other participants and the researcher on the periphery. Once the community was established, participants could enter the zone of proximal development when certain issues needed to be expressed. This is why structuring the problem was important as issues could be discussed, and modelled before taking purposeful action.

***Learning point:** The project developed a community of practice of sorts, due to senior management selecting 'Quality' to undertake the project. It may be debated that this was not a community of practice in the traditional sense as described by Lave and Wenger (1991) and Wenger (1998). With the project leaders committed to improvement in general, and other participants being invited to contribute and not being forced, a community could develop. It is proposed that the stronger the community of practice developed, the easier it is for participants to enter into the zone of proximal development where further learning could be undertaken. This is considered as participants would be more willing to commit to the learning being undertaken. Communities of practice cannot be directed but need to be encouraged especially in undertaking projects where a variety of expertise and skills are valuable, such as designing and implementing ISA.*

For a community of practice to be formed, the setting where project meetings and work are undertaken could be important. It is due to these issues that the work of Bandura (1986) is stated as important. If the location of project meetings affects participant's personal factors, behaviour and the environment, a community may be difficult to form and entering the zone of proximal development would not occur. The structure the project took involved meetings to discuss work participants had undertaken since the previous meeting. The project took this structure due to the GREAT process action lists (see Appendix G) that were used. Participants were tasked to undertake actions and the meetings were used to discuss each task, mark off the status, and add new tasks as they arose. The meetings therefore, provided the place where the language of concerns could be dialogued.

At meetings, participants bring the work they have undertaken to a particular setting within the organisation. In this projects case, it was a meeting room away from other distractions of the organisation. During the first phase of the project, a number of participants were situated near to each other in the open plan office as discussed in the previous chapter. This however did not seem to help or hinder the project in any particular way. Communication about the project outside of meetings was conducted through e-mail with requests and updates on tasks being undertaken. Bandura's (1986) theory therefore can mainly be seen through project meetings. The Quality



manager and project leader explained “*what we did initially, we’d ask for big open meetings for brainstorming where we defined what is a complaint*” (December 2004). These meetings required participation from the project team and could alter the three determinants (behaviour, personal and cognitive factors and environmental factors) (cf. Bandura, 1986) in a way that does not encourage participation and learning to occur. For example, participants may contemplate that the Quality employees will lead all the discussions as they are considered as being responsible for undertaking the project.

Quality were handed responsibility for the CCM project but only as the customer services manager explains, “*it was just finding a nucleus within the company who could roll it out to the whole of the company and who could influence the whole of the company*” (January 2005). Quality may appear as influencing the environment in which meetings took place even though they encouraged participation. Individuals may have been convinced their contributions were not important or not related, as the workshop supervisor stated, “*this isn’t probably what you’re wanting*” (October 2003). These big open forums may not have provided the right environment for some participants. An example could be if participants were not comfortable in making suggestions or raising specific points as the customer services manager stated as the ‘fear factor’. Going back to the work of Bandura (1986), trying to influence an environment is a pointless exercise as it depends on where in a time sequence specific behaviour has been identified. Through Bandura (1986), the meetings could be better explored to identify the suitability of such an approach as part of undertaking SSM<sup>XL</sup>.

Personal factors could be the reason attributed to a lack of contribution highlighted within the CCM project. To help all participants, a change in behaviour may alter these personal factors. Introducing another element to the project, in the form of senior management, may have increased participation as the example given in Chapter Three explained. The project leaders however did not agree. The Quality manager and project leader wanted senior management to be involved in the latter aspects of the project, but did not indicate they were required during the exploration stages. The product performance manager stated, “*I think it would have given people a bit more confidence that everybody was buying into it all through the development. There is a no, more from the fact that people can get on better with what they’re doing without*

*interference from senior management*” (January 2005). The 2<sup>nd</sup> customer services team leader also wanted senior management to have been involved, but not to influence the participants, *“just they could have given us more input from their perspective of what they wanted from it...”* (January 2005). The project leaders seem to have appreciated that using senior management to try to influence other participant’s behaviour and in turn, their personal factors was not required.

Whilst it could be argued that the theories of learning stated are not applicable, or that they have not been identified, the discussions that relate to their use and the exploration of alternative processes is argued to have value. It is stated that other interpretations could be drawn. The interpretations presented could allow a project team to alter how SSM<sup>XL</sup> could be used to increase the chances of generating more suitable learning activities. Using the theories is argued to add value to designing and implementing ISA, especially when using SSM<sup>XL</sup>. From this thinking, what was uncovered is now summarised by expressing the problem situation even though SSM<sup>XL</sup> was not presented formally.

#### 7.3.4 Summary from Expressing the Problem Situation

The problem situation was expressed through the rich pictures and AIM document that was constructed, at the request of the participants, using the interviews undertaken in October 2003. The document tried to put perspective into the issues that related to the CCM project, but also identified other problems individuals within the organisation face. The aim of the outcome of this stage was to give the participants a place to dialogue about such issues. The document produced was perceived positively with the team considering all input due to them undertaking an unfamiliar process. The project leaders on the customer services side seemed to receive more value from the document. It may be that the customer services individuals have to deal with tacit issues regularly. On the other side of the organisation, the Quality employees, with their background in hard systems thinking from the discipline of engineering, whilst being able to use the document, may not have received the same value. It was agreed by all four participants that the document was used to help express the problem and structure the project. If the Quality Department are perceived to, or do lead a majority of projects, including IS, SSM<sup>XL</sup>

may provide value in drawing out the tacit issues that may not be recognised through traditional methods Quality use.

*Learning Point: The use of SSM<sup>XL</sup> for the BreathCo project has helped other organisational problems surface that could also now be addressed. Individuals and other organisations however have specific ways of working and conducting projects (e.g., brainstorming meetings). It was important that SSM<sup>XL</sup> can take these ways of working into account. The tools used of AIM and the rich pictures were deemed valuable by the four project leaders in communicating different perspectives of the same problem. The SSM<sup>XL</sup> framework has been designed to be used with other individuals; therefore, it is important that the perspectives of the participants are incorporated, as it is these individuals who will be the beneficiary and users of the solved problem situation.*

As well as becoming part of the project team and trying to hold true to the forms of co-operative inquiry (see Heron, 1996, 1999; Heron and Reason, 2001), the researcher was also coming to terms with the way BreathCo operates and undertakes projects. The main findings uncovered that related to this specific project were:

- who is responsible for complaints/concerns currently,
- perceptions of receiving complaints/concerns currently,
- individuals defensive routines (see Argyris and Schön, 1978) that may be in place to hide complaints/concerns received, as well as developing a shared mental model (see Senge, 1990) of how the project should be conducted,
- helping other individuals within the organisation to see the project through the benefits an organisation would receive.

Table 7.4 provided examples of individuals engaging in these issues. Along with these specific project issues, Table 7.4 also provided suggestions on the way the project should be conducted, how the team was selected, and making the benefits of the project explicit to senior management so a budget could be allocated. These final three issues are related to general project management. Project management within BreathCo mainly follows the GREAT practice with other decisions being left up to a

project team. Along with conducting the project, individuals have to contend with what they see as:

- the organisation operating too slowly,
- having to constantly be reactive and other operating problems currently faced.

By expressing the problem situation through the rich pictures and the compiled AIM Venn diagrams, action could be undertaken to focus the project team in modelling solutions based on what was expressed, alongside the GREAT tools in the absence of using a formal project management guide.

On conducting the follow up analysis, the ten participants seem to support what the product performance manager states. The product performance manager asserts that the Quality Department would deal and solve all the organisations complaints/concerns before the introduction of the technology. One of the objectives of the project is to make all individuals aware and responsible for concerns, which does at present not seem to be happening. Issues such as this can relate to what Checkland (1993) and Checkland and Scholes (1990) refer to as the 'Actor' aspect of the CATWOE mnemonic. The information from the interviews could be used to extract each participant's perceived CATWOE. If the CATWOE shows that all participants perceived Quality to be the actors of the situation, the AIM Venn diagrams and rich pictures constructed may not have structured the problem situation as well as first thought. This aspect was to be undertaken through the modelling stages of the framework (stages 3 and 4). This phase of the analysis is now discussed.

#### **7.3.5 Constructing Models through Systems Thinking**

Moving into the modelling aspects of SSM<sup>XL</sup>, access to the organisation was limited even though contact was maintained with the customer services manager and the project leader through e-mail. Stage 3 of the SSM and SSM<sup>XL</sup> was to develop models. As was described in Chapter Six, no formal root definitions of the relevant systems or formal conceptual modelling was undertaken by the participants. Modelling was undertaken, but represented a form of flow modelling similar to what Stowell and West (1994) describe as a black box diagram. In conjunction with this an information retrieval framework, similar to what Stowell and West (1994) describe as a decision

table, was also developed. Before the modelling is undertaken however, a review of the CATWOE analysis undertaken, based on the data, but not revealed to the participants, should be identified; to see what each participant perceived as the 'client', 'actors', 'transformation', 'weltanschauung', 'owner', and 'environmental constraints'. Identifying what each participant believed is important allowed the three root definitions, or what was put to the project team as systems definitions, to be stated. It was hoped that the participants would do likewise.

#### **7.3.5.1 CATWOE Analysis**

The first four issues of Table 7.4 can in some way be seen as similar to some of the issues that needed to be formally identified through a CATWOE (see Checkland and Scholes, 1990) analysis. According to the original use of Soft Systems Methodology (reviewed in Chapter Two), the CATWOE analysis is undertaken during the modelling stages of the framework. As this was not undertaken with the participants, it was hoped that the tools of rich pictures and AIM Venn diagrams would focus the participants on a systems perspective on the issues uncovered.

The CATWOE was constructed for the purpose of examining what participants believed to be related for each specific CATWOE activity, in comparison to what the project team collectively perceive would actually be developed to solve the problem of complaints. The researcher therefore, was trying to encourage systems definitions without the construction of formal CATWOE's. It may be stated that the CATWOE's developed were used as a check to see if certain participants were influencing certain decisions, and not partaking in co-operative inquiry that the project promoted. If individuals could not further draw out their thinking with the tools already used, then the framework developed could be classed as a failure, as a systems perspective may be missed. This was the purpose of the rich pictures and why they were used instead of a formal report or other presentation methods, as it is argued participants need to get value from SSM<sup>XL</sup> and not rely on researchers' or other consultants to use this on their behalf.

Networks were constructed in ATLAS.ti relating to aspects of the CATWOE mnemonic. The purpose of constructing networks was to allow a focus to be maintained on all of the issues for each element of the CATWOE, instead of

identifying one particular issue from each participant. This technique allowed a greater focus on which elements of CATWOE applied to each individual. The 'Transformation Process' and 'Weltanschauung' were identified through an overall picture of the 'customers', 'actors', 'owners', 'environmental constraints', as well as other issues emerging from interviews. It needs to be emphasised that these interpretations are the researchers' and not the participants. The outcome of this analysis has been displayed in Table 7.5 below.

Employee	Customers	Actors	Transformation Process	Weltanschauung	Owner(s)	Environmental Constraints
Quality Manager (Project Leader)	External customers who buy products from the organisation and internal employees (equal importance).	All concerns go through one route (one department).	The current gap in complaints is transformed into having no gaps in complaints throughout the organisation as all complaints are captured.	Identifying and solving complaints can make the individuals of the organisation more effective.	Other departments not taking responsibility.	The cost of an education programme to all employees. No formal budget to undertake the project.
Repair Co-ordinator	External customers who buy products and who individuals of the organisation buy equipment from. Other departments within the organisation (external more important).	A department to handle complaints.	The slow response for handling complaints is transformed into a quick response for handling complaints.	The process for handling complaints needs to provide a quick response.	Senior management.	Unable to answer.
Shipping Supervisor	All departments (equal importance).	The individual who receives the complaint.	An unsatisfied customer becomes a satisfied customer.	By satisfying a customer by whatever means necessary will increase a customer's satisfaction with the organisation.	All individuals within the organisation.	Unable to answer.
Receptionist	Did not answer.	Senior management for each department.	Not enough information given to construct a transformation.	By transferring, a customer to the right department through the switchboard allows the customer to reach the appropriate individual within the organisation.	Human Resource Manager.	Unable to answer.
International Team Leader (Customer Services)	Everyone (external and internal) (External more important).	An individual to represent each department.	A customer with a problem is transformed into a customer who has had their problem solved.	Internal departments can handle complaints that solve external complaints.	Senior management.	Unable to answer.
Product Planner	External and internal (external more importance).	Sales and marketing department.	Numerous unstructured different problems that individuals of the organisation face can be transformed into a structured format where problems can be solved more effectively.	Specific people handle specific problems with the outcomes being communicated throughout the organisation.	Senior management.	None. It is up to individuals to come up with solutions they believe are appropriate.
Customer Services Team Leader 1 (Instrument Specialist)	External people that are sold products and internal departments (external first, field engineers and then internal departments).	A large team.	A customer with a complaint over the time it takes to receive a replacement product is transformed into a customer who receives a replacement product quickly.	A customer who has to return a faulty product should not have to wait for it to be returned to the parent company before getting a replacement.	The Quality Department's current quality process.	Unable to answer.
Repair Administrator	Unable to answer.	The department that could solve the complaint.	An unsatisfied customer is transformed into a satisfied customer.	To satisfy the customer by whatever means necessary including lending a customer any	Managing director.	Unable to answer.

Employee	Customers	Actors	Transformation Process	Weltanschauung	Owner(s)	Environmental Constraints
				equipment required.		
Product Performance Manager (Quality Department)	End user of products and internal employees (end user more important).	A cross-functional team.	An unsatisfied customer is transformed into a satisfied customer.	The product performance manager is not the only individual responsible for handling complaints in the organisation and this is done by whatever means are necessary.	Other individuals within the organisation not buying into the need to satisfy customers.	Finance. It is assumed no finance has been allocated for the project.
Workshop Supervisor	Everyone (external and internal) (external more important).	A complaints department	A customer with a problem is transformed into a customer with a problem solved in the quickest amount of time possible. A customer with an invoice complaint is transformed into a customer with a correct invoice.	Never put off solving a customers complaint by investigating the problem and communicating this back to the customer. By having an invoice completely correct, a customer will not complain and pay promptly.	People with the appropriate product knowledge to provide support. Senior management.	Time to complete the project and the overall cost of the project.
Credit Control Accountant	Customer Services Department (main focus).	The individual who made the error.	A customer with a complaint is transformed into a customer who has had their complaint resolved within the capability of the individuals of the organisation.	Being an industry-to-industry customer the amount of customer service available will be different to a company such as Sainsbury's.	Senior management not allocating sufficient resources.	Not trying to meet the satisfaction of other retailers in other sectors such as Sainsbury.
Product Improvement Manager	Anybody that pays money to the organisation and internal employees (external more important).	Departmental managers.	A customer with a problem is transformed into a customer who has had their problem solved where the individuals of the organisation will implement solutions so the same problem will not re-occur in the future.	To provide satisfaction to all customers and at the same time not to put short-term quick fixes as this will make the individuals of the organisation less effective.	Senior management are committed so no one.	Time to get the project complete as well as the time to get the whole team together for meetings. The cost of implementing a solution.
Customer Services Manager	Numerous types of external customers and internal employees (external more important).	One committee to look at all complaints.				

Table 7.5  
Soft Systems Methodology CATWOE Analysis



Table 7.5 has been constructed to show the many different opinions and thoughts that individuals have regarding how to solve the problem of ‘customer complaints’. It should be noted that by using interviews not every element of CATWOE was able to be extracted in the CCM project. The actual extracted data proved useful. Through the ‘Customers’ column of Table 7.5, most individuals believed that the customer of a ‘customer complaints system’ are both external and internal individuals. Nine individuals stated that external customers should be the individuals who receive most benefit from the outcome of the project. A number of individuals (nine) also appreciated that internal departments and employees were important, but believed the primary focus should be external customers. The main reason for this thinking relate to the money that external customers spend that keep the organisation in business. This can be seen through the following quotes:

*“Right, obviously anyone who buys our product or services...”* (Interview with the Quality Manager, October 2003).

*“...or anyone who purchases anything from us...”* (Interview with the Repair Co-ordinator, October 2003).

*“Erm, certainly external customers to whom we make sales...”* (Interview with the Customer Services Team Leader (Instrument Specialist), October 2003).

*“Certainly anybody that pays money for a product or a service from you”* (Interview with the Product Improvement Manager, October 2003).

By constructing the Actors column of Table 7.5 (the third column), the individual(s) who are perceived to be responsible for the outcome of the project is varied. Thoughts are around a department to handle complaints, either one that is already in existence within the organisation, or forming a specific department for this purpose. Other individuals pointed to the senior management of each department, the department that caused the complaint, or the individual who receives the complaint. What is certain is that more than one individual within the organisation should be

responsible with only one reference to the Quality Department which came from the customer services team leader 1 (instrument specialist).

The transformation process and Weltanschauung columns of Table 7.5 show the many different worldviews and transformation processes that are believed to solve the identified problem area. Some are similar, on a general level in respect of transforming an unsatisfied customer into a satisfied customer (the shipping supervisor, repair administrator and the product performance manager), whilst others focus upon each individual's job within the organisation (the credit control accountant and the receptionist), and the response time it takes for individuals within the organisation to undertake an action (the repair co-ordinator and the customer services team leader (Instrument Specialist)). With these worldviews therefore, the action to improve the problem situation could include one or a number of the perceived solutions.

Who will own the 'system' provided more of a consensus from all individuals, as most thought this would be senior management. Senior management was stated six times with the managing director and human resource manager only being stated once. The next highest issue for the owner of the 'system' were other individuals within the organisation either not taking responsibility (the Quality manager), or not buying into the process (the product performance manager). Two interesting issues came from the customer services team leader (instrument specialist) and the workshop supervisor. The former employee states that the current Quality Department's quality process would own the outcome, while the latter employee considers that individuals with the appropriate product knowledge to provide support would have to own the outcome. These points are interesting as they relate more to processes or procedures within the organisation and not to other individual's commitment essentially. If this is thinking is not made explicit, the action to improve the situation may be less effective, as organisational procedures may need to be modified for any solution to be implemented.

The final column of Table 7.5 related to Environmental Constraints. This column provided the most 'unable to answer' responses even though the question was specifically asked. It is thought that this related to firstly, the individuals of the

organisation trying to improve a situation that currently does not exist and secondly, any proposed solution will not change how something was operating within the organisation. It was harder therefore, to list any constraints the project would need to abide by. The main constraints that were listed related to various aspects of time from completing the project, to individual's time to attend project meetings (the customer services manager), and the cost of the project. The Quality manager who was the overall project leader summarised what can be described as the main constraints when he stated, "*cost [pause] there'll be an education programme, as well we'll have to educate our own people and our customers I think*" (Interview with the Quality Manager, October 2003). Table 7.5 demonstrates that a majority of individuals see the customer as external people who buy products and services from BreathCo. The actors who will perform the transformation process however are more varied, along with who will own the 'system'. Most individuals consider senior personnel in a variety of guises as owning the outcome, which will be produced with environmental constraints from those who answered relating to time, money, and educating people.

It was through the construction of Table 7.5 that the systems definitions were constructed as displayed in Chapter Six and repeated here:

1. *A BreathCo owned and operated system to capture external customer complaints in a cost effective manner, which can be used to make BreathCo more effective.*
2. *A BreathCo owned and departmental operated system to capture external customer complaints in a cost effective manner which can be used to make BreathCo more effective.*
3. *A senior management owned and BreathCo operated system to solve unsatisfied external customers problems by satisfying them by whatever means necessary.*

From these three system definitions, it was hoped that the participants could develop their own definitions, or debate the definitions presented in conjunction with the rich pictures and AIM Venn diagram outcomes. What needs to be taken into account is that with these differing opinions on how to proceed with the project, it was unknown if the document produced would be able to focus this thinking as clearly as Table 7.5.

The tools used were intended to focus and draw out systems perspectives without having to formally use CATWOE's and formal root definitions, if participants were unwilling to learn or did not have enough time to undertake them.

**Learning Point:** *It is not always feasible in a business environment to take a substantial amount of time away from key tasks, as shown through the problems that employees of BreathCo face, unless it is very important. Formal root definitions and conceptual models therefore, can be difficult to undertake in some cases, especially if a workshop is not set aside to develop these models. Other tools such as the AIM Venn diagrams and Rich Pictures may be able to assist in this task, but they have to be able to provide communication, debate, and questioning. If a discussion can be initiated it can be the first step in creating a dialogue, which will then form the language required to undertake a project as the theories of the learning organization try to emphasise.*

It can be stated that the researcher's constructed CATWOE did not provide any startling differences overall, to the points and issues being demonstrated by the participants, through the AIM Venn diagrams and rich pictures. The document produced was aimed to produce what is stated in the above learning point, so it is important to see how well the issues that were not in full agreement (Actor, Transformation process and Weltanschauung) can be explored through the modelling.

#### 7.3.5.2 Analysis of How the Models were Developed

Within Chapter Six, an information retrieval framework was presented that was used to collect further data from other individuals within the organisation by team members. The table set out the different categories of complaints that were uncovered through trying to structure the problem situation, and within which departments these complaints could exist. These departments could chart the boundary of any 'system' that needs to be focused upon. It may be argued that the eight questions deemed to be applicable, were demonstrated through the document presented and therefore, the project team were made aware. The participants conducted the research within their departments informally and the answers were fed back to the team at a project meeting. As individuals mainly handled complaints informally, and little logging existed, these were key points that needed to be modelled. By answering the eight

questions posed, the project team would be able to model a potential solution more effectively. Within traditional Soft Systems Methodology, and what has been argued in Chapter Two, this stage of the modelling requires the use of systems thinking. The project team therefore need to be able to consider the project through systems thinking. If the team could not do this for themselves, the researcher may have to alter the co-operative approach promoted and move to a pure action research approach as other authors describe (see Avison and Fitzgerald, 1995; Bell, 1996; Checkland, 1993, 1999; Lewis, 1994; Open University, 2002).

Through the code frequency table (see Appendix F), the code 'systems thinking' was identified within the data. This identification of the issue of systems thinking could imply participants were able to take a systems perspective through the approaches encouraged by this research, or other processes BreathCo currently use. A closer look at this issue will now be undertaken. The code 'systems thinking' was coded whenever a participant stated or referred to a 'system' in general. The outcomes have been placed into a network and can be seen in Figure 7.5.

Figure 7.5 displays a few of the 27 quotes that were coded for systems thinking. Figure 7.5 also displays some of the other issues that are considered to be related and have been discussed so far through this analysis. Figure 7.5 displays examples of the way 'systems' are thought of within BreathCo, but this does not always constitute 'systems' within the discipline of systems thinking. As formal root definitions and conceptual models were not made formally explicit, what needed to be seen was if the concept of using systems thinking would be missed. One example is presented by the international team leader for customer services when discussing how many 'systems' are inter related as shown through link 'A' (Interview with the International Team Leader for Customer Services, October 2003). Whilst the participant states that the computer has to go through many systems, whilst not using systems thinking correctly in that instance, the participant has mentally drawn a boundary around all of the computers she is describing and is able to discuss the problem.

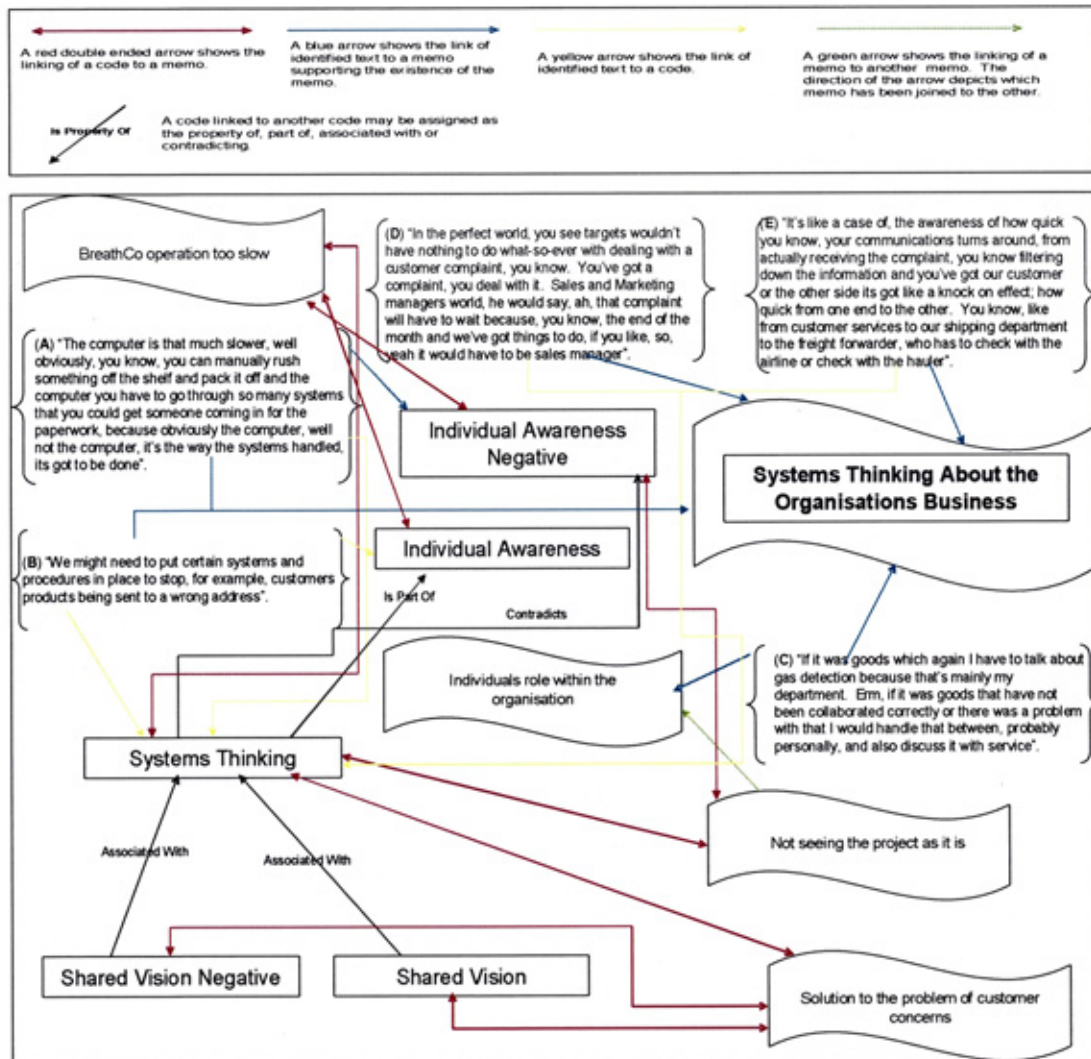


Figure 7.5  
*Systems Thinking within BreathCo*

Another example shown in Figure 7.5 comes from the product planner discussing how goods are delivered from BreathCo to the customer as shown in link 'B' (Interview with the Product Planner, October 2003). The product planner refers to putting a 'system' in place. It is assumed he is using the term generally and the word procedure should have been used instead. If the product planner was to elaborate on the 'system' to undertake this task, he may be using the term system for the purpose of systems thinking. Therefore, 'systems thinking' is regarded to relate to an individuals awareness of processes which has already been discussed. If an individual is aware of certain processes and procedures, they may be able to think of them through 'systems thinking' principles. If they cannot, their awareness will be negative which is argued to contradict what systems thinking promotes. If the project team cannot see and become aware of these issues, they may have a negative awareness and propose

solutions that would not benefit or solve the problem. This could result in not seeing the project as it should be. This negative awareness, as has already been explained, may relate to an individual's role within the organisation. There is no better example than this quote from the customer services team leader 1 (instrument specialist). A question was asked to customer services team leader 1 (instrument specialist) to which she immediately responded by stating she could only speak in relation to her department as shown by link 'C' (Interview with the Customer Services Team Leader 1 (Instrument Specialist), October 2003). This quote does not state that the participant would not be able to use systems thinking, only that with the thinking displayed by focusing upon her department, she may currently not. The document produced (the AIM Venn diagrams and Rich Pictures) tried to help team members focus on the problem situation through systems terms.

The international team leader (customer services) gives another example of trying to think in systems terms through link 'D' (Interview with the International Team Leader (Customer Services), October 2003). Although not systems thinking as such, the international team leader could use this thinking to explore and model processes that could enable dealing with a complaint. The shipping supervisor goes on to provide another example of awareness of thinking in systems terms by drawing a boundary around the process of complaints as shown by link 'E' (Interview with the Shipping Supervisor, October 2003). Systems thinking may help propose a solution to the problems of customer concerns. If the project team can dialogue and language these issues it could allow a 'shared vision' to develop. If no individuals can use systems thinking, it could allow a 'negative shared vision' to develop. If this happens, each individual would have a different perspective on how the problem situation should be solved. This could allow other less effective issues to be used to define a solution to the problem. What needs to be explored is if the developed models took a systems perspective. In addition so does whether if the rich pictures and AIM Venn diagrams used, helped influence the models produced, along with the systems definitions, in a way similar to CATWOE and root definitions helping model conceptual models.

Using the data collected from the information retrieval framework, the modelling was undertaken (through stage 4 of SSM<sup>XL</sup>). The process of how complaints could enter the organisation and where they end up was charted. This may have provided the

systems thinking the stage required, as a boundary was drawn around the departments, processes, and individuals that were to make the 'system' to solve customer complaints, and how each can relate to the others was discussed. Placing this boundary could be described as the human activity system (see Avison and Fitzgerald, 1995; Checkland, 1993; Wilson, 1984) for this project, as it identified what activities need to be undertaken by an individual and the social system involved. The models constructed are argued to answer the 'what' aspect to change and 'how' this change can be undertaken (cf. Wilson, 1984). Processes that were missing were added to the flow models and were identified as needing to be included in any potential solution. This can be considered as being similar to the overlay approach as described by Checkland (1993) as one of the four techniques used in the formal Soft Systems Methodology. To accompany these models, a complaints code matrix was also developed as a way to categorise all complaints individuals of the organisation could receive. A Microsoft Excel spreadsheet was used to pictorially represent how a user interface could be developed, which took into account the 'system' that best represented a way to tackle the issue of complaints. The user interface developed could be used to engage a dialogue with any information systems developer, as it could easily be recognisable to such individuals when compared with root definitions, conceptual models, or flow charts.

It is thought the document produced helped with the modelling by providing an overview of all individuals' issues. These issues were made explicit in an attempt to provide the 'systems thinking' the modelling stages require that formal root definitions and conceptual models enable. The project team also stated the document that was produced proved valuable and the document was used to help define the models. During the follow up interviews, how the models were designed was focused upon as a reflective process with the project team. Figure 7.6 has been used to identify some of these issues.



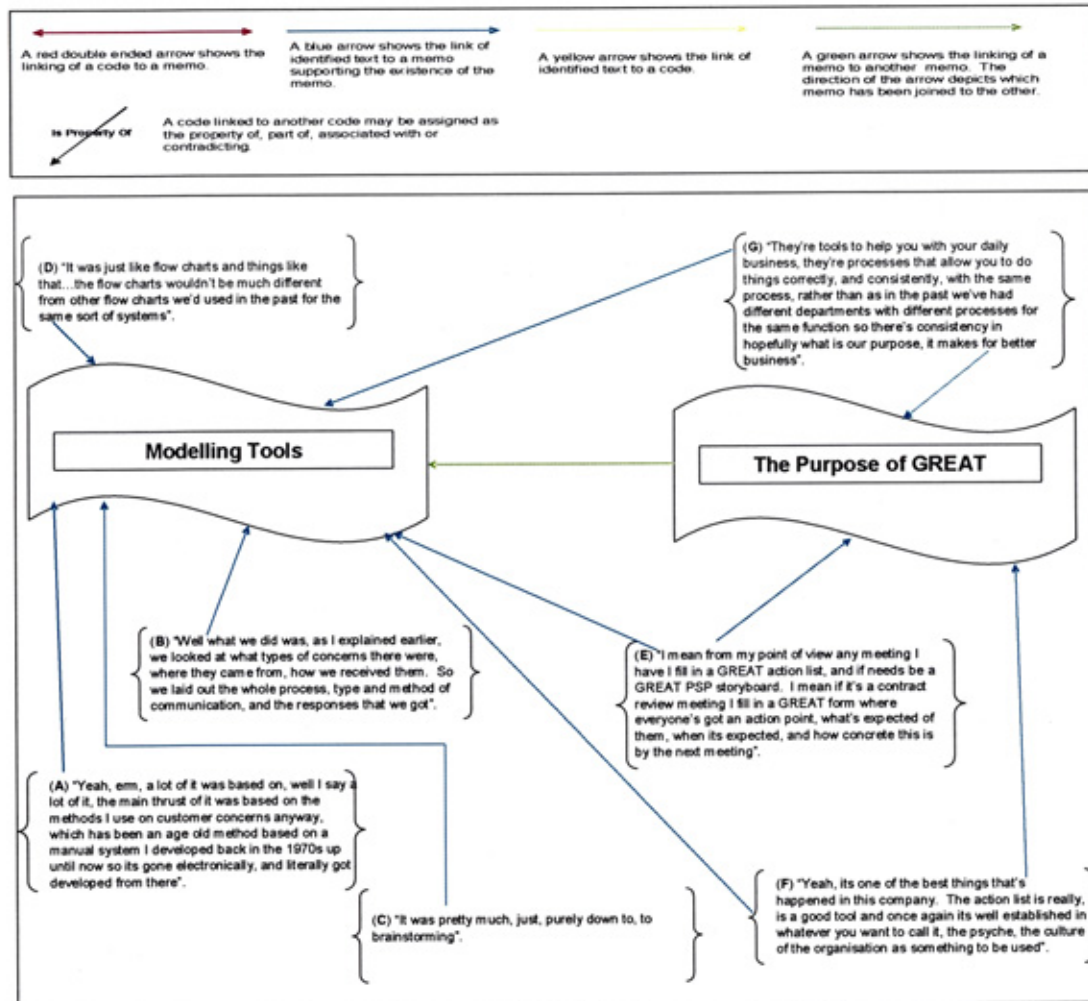


Figure 7.6  
*Modelling Tools Used to Create the Project Design Models*

Figure 7.6 demonstrates the supporting quotes of why the modelling was undertaken using a flow modelling approach. The product performance manager used his manual system as a guiding focus for him personally, as shown by link 'A' (Interview with the Product Performance Manager, January 2005). The Quality manager regarded the process as trying to identify what complaints/concerns existed, but were not captured, as shown by link 'B' (Interview with the Quality Manager, December 2004). The customer services manager stated that it was the project team developing the models through interaction with other team members. This interaction was used in the process of brainstorming as shown by link 'C' (Interview with the Customer Services Manager, January 2005). The 2<sup>nd</sup> customer services team leader also regards flow charts as being a familiar used tool within BreathCo and they were also used for this project as shown by link 'D' (Interview with the 2<sup>nd</sup> Customer Services Team Leader, January 2005).

The quotes attributed to Figure 7.6 have been linked to processes of familiarity. These familiarity processes allow the project team to be comfortable in undertaking the modelling, and as can be seen these processes are thought to relate to the GREAT process used within BreathCo. This thinking is evidenced through a number of the quotes displayed. Firstly, the customer services manager elaborates on his use of GREAT in link 'E' (Interview with the Customer Services Manager, January 2005). Secondly, the Quality manager favours their use within BreathCo as shown by link 'F' (Interview with the Project Leader, December 2005). Finally, the product performance manager uses GREAT tools as a way to provide consistency throughout the organisation, and believes they should be used for all processes including this project, as shown by link 'G' (Interview with the Product Performance Manager, January 2005).

From these quotes, it can be seen why these tools are preferred. GREAT tools try to make processes within BreathCo consistent. If other projects chart processes through flow modelling and GREAT processes, it makes sense for the project team to use them for this project. Trying to undertake root definitions and conceptual models may have been a difficult exercise for these participants, even though they would provide the systems thinking that SSM requires. If root definitions and conceptual models were undertaken, it is unknown if they would be used again in other similar projects when other individuals or consultants are not there to help. The document produced containing the rich pictures and AIM Venn diagrams may have been accepted due to the easiness of use and understanding it provided. This is why it could help the modelling and try and encourage the 'systems' thinking that traditional Soft Systems Methodology requires. Whilst GREAT is not a project management process officially, it contains tools within it that individuals like to use as they are familiar to use within a reactive organisation.

***Learning Point:** Some form of modelling is required to propose various solutions to a structured problem situation. Soft Systems Methodology uses CATWOE's, Root Definitions, and Conceptual Modelling, but it is not always possible to undertake them. This project used an information retrieval framework that worked well as it considered potential user's perspectives and flow-charted what the potential solution should achieve. Alternative tools therefore, could be used to take a systems perspective, even if not formally undertaken, if individuals of an organisation cannot spare the time. It needs to be remembered that using traditional SSM approaches will provide more accepted processes (e.g., root definitions and conceptual models) to a project team but as long as the approaches used have the same emphasis in identifying human activity systems they could be used.*

Whilst the analysis in this section has explored how systems thinking may or may not have been undertaken, another important issue that SSM<sup>XL</sup> has tried to focus upon is that of language development. The issue of a change in language and language development throughout the framework needs to be drawn out. The language that was used within the models and the change in title (from complaints to concerns) could have an affect on how the project team and end users may react to the models developed and proposed solution presented. In addition, any disagreements that were raised also had to be managed.

#### **7.3.5.3 Language Development and Resolving Disagreements**

With any organisational activity there are bound to be disagreements on how to proceed at various points especially in the life of the project. It is at the modelling stages of SSM<sup>XL</sup> that potential issues and disagreements may emerge formally. This is why it is important that at stage 2 of SSM<sup>XL</sup>, participants acknowledge that a problem has emerged and it is expressed. Once that has been achieved, a dialogue on the problem can take place with mental models being challenged. Once into the realm of systems thinking, the dialogue needs to develop into a shared language about the problem. Developing a shared language can allow the problem to be discussed systemically, with models being constructed to aid the language development and further challenge mental models. This process was designed to be influenced through the document produced for this particular research, but different tools and techniques could be used in other cases. A problem could occur if more issues than the

participants had envisioned are raised, or not enough issues are raised due to a lack of exploration of the expressed problem. If the techniques used have not raised enough issues, it could allow participants to still focus upon their own issues and not on the issues that need be addressed for the project. If the last point holds true then the document produced for this research, and the issues that need to be more explicit, may not be as successful as the participants interviewed, had believed. It is worth focusing on this issue further.

In reviewing the CCM project, it was firstly inquired how agreements were reached on issues such as the different categories of complaints that were identified. Secondly, it was asked if these complaint categories defined aspects of the finished model. The Quality manager stated that the category of complaints was constructed the same way as the flow models. Concerns were identified by type, location, and where complaints come from. From this list the matrix was formed. The Quality manager continued by stating that the categories developed were used but have been expanded, *“what happened is the initial categories have now expanded. What we did we developed a series of codes for various complaints, concerns, types. So that’s continually expanded as we’re getting more and more use from the system”* (December 2004). The product performance manager also agrees with the Quality manager as forming the codes from the history of complaints within BreathCo when he states, *“that’s more or less historical, its something I’m keen on improving so we get better information, better, not better categories but more defined categories of complaints so we can see where the problems lie”* (January 2005). The customer services manager regards the categories as being developed from what came out of the brainstorming exercises,

*“it came from the brainstorming exercises, and it was purely down to the experience of some of the people who were in the team. We were the ones who would get the telephone call, we’d get the e-mails, we’d get the faxes from the customer. So it was quite easy to categorise the types of calls we’d get coming in. Plus we’d also have a customer returns process where its stuff that has been sent out to the customer and it’s come back to us. We had different categories in that project. It’s not all down to BreathCo, it could be that the customers ordered incorrect goods; the shipping company’s cocked up. So we used some of those reasons as well”* (January 2005).

The 2<sup>nd</sup> customer services team leader considered some of the categories she was familiar with as being taken from a number of sources,

*“we chose from SAP, things that were inputted that we needed, say for returns, you know, reasons for returns and reasons we had for complaints...we also have my returns database that I use, all I did was just collect data and didn’t actually do anything with it, but on the collected data I had a lot of reasons for returns, so we just used those too”* (January 2005).

The 2<sup>nd</sup> customer services team leader did not actually answer if the codes were the same ones that were eventually used within the ISA. The other three participants stated they were the same categories, so no further questioning was followed up. These quotes demonstrate the categories assumed, were brought about through issues identified, relating to problems stemming from job roles on the customer services and Quality aspects of BreathCo’s operations. These statements seem to explain how the category of complaints were developed, but also supports the issue on selecting the project team. This can be stated as the customer services manager admits that the basis of the categories came from each individual’s perspective from their own experiences. Once dialogued, the complaints were grouped accordingly, assigned a category code, which then made up the matrix. It was important to note the increasing importance of the team meetings to discuss these issues together, while other work was undertaken away from the meetings. As has been pointed out, work on the project drew on individuals’ experiences and personal knowledge of their job role within the organisation. This is a very important aspect and is argued as having been identified through a theory of social learning.

In agreeing to the complaints code categories, any disagreements raised were tackled through ‘brainstorming’. Whilst the complaints codes may have been tackled through dialogue, and the development of a language of ‘complaint codes’; it needs to be examined if the same process was followed for developing the other models. A question inquiring into the main disagreements and themes that had to be resolved in creating the models was put to the project leaders. The 2<sup>nd</sup> customer services team leader stated, *“I think really just where responsibilities lie”* (January 2005). On resolving this issue of responsibility the 2<sup>nd</sup> customer services team leader stated, *“just*

*thrashed it out in the meetings, you know, and just general talk and brainstorming...I don't think we had a lot of disagreements really*" (January 2005). On asking the product performance manager the same questions, he commented,

*"the only things I can remember were consistency of headings (a) throughout the model, consistency of themes i.e., if we use phrases in the model, to me they had to be identical to the phrases we use in other processes, other than that I can't remember any problems or disagreements we had"* (January 2005). These were resolved by, *"discussion"* (Interview with the Customer Services Manager, January 2005).

The customer services manager on the other hand acknowledged little disagreement existed because,

*"it was just non-commitment, more than disagreement, for various reasons. [Researcher] so if people contributed more you'd think it would have given more avenues to explore? [Customer services manager] yeah I think it's more of a fear factor as well"* (January 2005). These problems were resolved by, *"kicked out the dead wood [laughter]. ...I mean I still think everyone had some use at the beginning [working through SSM<sup>KL</sup>] but there was no need for the whole team during the development phase"* (Interview with the Customer Services Manager January 2005).

This lack of commitment the customer services manager identified could result in the project moving slowly, as well as participants having other work to commit to which, in turn may reinforce a lack of commitment across the organisation.

Focusing back on how disagreements were resolved within the team, the Quality manager highlighted his own misunderstanding as an issue that was resolved and clarified, *"because my understanding was that it's easy to, to send acknowledgement, we've received this concern and we're dealing with it, because I assumed everybody was on e-mail and they're not. So that was a lack of understanding on my part"* (December 2005). This issue of acknowledgement was incorporated and resolved within the model that not all concerns needed to be acknowledged by e-mail.

It can be considered that through discussion, brainstorming and language development were the focus of resolving any disagreements arising in the models. These answers can again add to the increasing emphasis on the social aspect that participants had with each other in developing the models, along with the language that had to accompany it. The customer services manager indicated the problems of other participants not contributing effectively to the project. Further contributions could have expanded the developing language. Due to other participants not being as committed to the project as the project leaders, their input was considered to be lacking. These issues may go some way to exploring why the four main project leaders, on developing the models, perceived the project would be more successful if they continued by themselves. This is believed due to the project leaders having the primary input and having been at the core of the community. This may also be seen as the main project leaders moving to the centre of the community of practice (see Wenger, 1998; Wenger, McDermott and Snyder, 2002). At the start of the project, all participants were co-opted onto the project by invitation, as they possessed knowledge that would be valuable to the project. But as the project moved forward these other individuals, whilst their contribution was important at the structuring of the problem situation, seemed to move mostly to the periphery of the complaints/concerns community.

It was highlighted at the start of this chapter (and Appendix J), through the end users of the ISA, that the language of 'concerns' was an issue. Other language issues related to having 'ownership' and/or 'responsibility' for a complaint/concern. How was this language developed and why was it used? Figure 7.7 contemplates this issue.



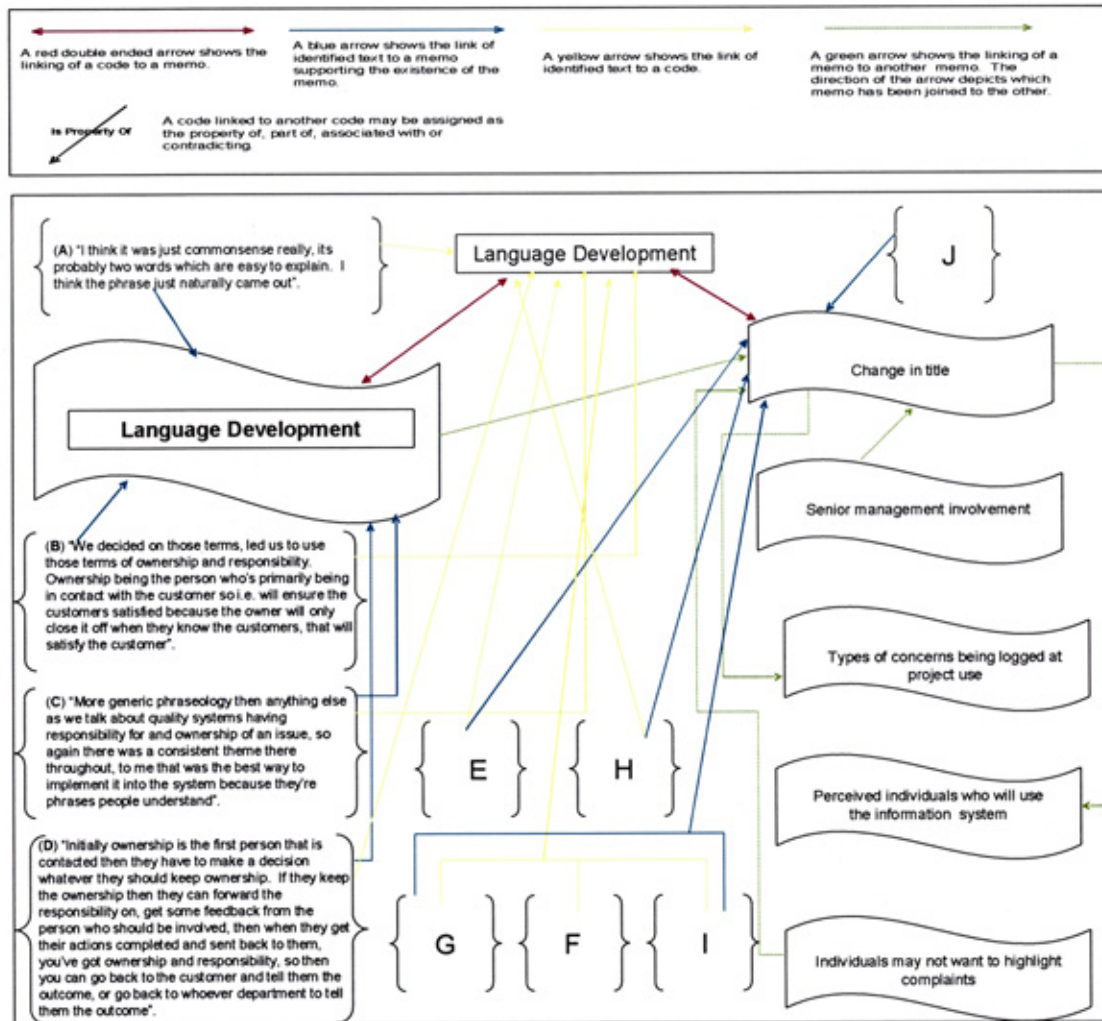


Figure 7.7  
*Further Language Development*

Figure 7.7 has been developed to see how the language of 'ownership' and 'responsibility', that is argued as important, was developed. As well as this issue, Figure 7.7 demonstrates other issues that are linked to the language of complaints and concerns. The customer services manager offers the perspective that the language of ownership and responsibility were used for familiarity purposes, as shown through link 'A' (Interview with the Customer Services Manager, January 2005). The Quality manager elaborated a little further on the difference between an owner of a concern or an individual who has responsibility, as shown through link 'B' (Interview with the Quality Manager, December 2004). The product performance manager agrees with the customer services manager by stating language was developed through familiar processes BreathCo uses, as shown by link 'C' (Interview with the Product Performance Manager, January 2005). Finally, the 2<sup>nd</sup> customer services team leader explains in a little more detail about the description of being an 'owner' and/or having



‘responsibility’, as shown by link ‘D’ (Interview with the 2<sup>nd</sup> Customer Services Team Leader, January 2005). These quotes demonstrate the language developed for specifically having ‘ownership’ and/or ‘responsibility’ as being constructed through other processes within BreathCo, and is a familiar concept to individuals on both the manufacturing and service side of the organisation. As has been highlighted by examining issues concerned with end users usage of the information system application, this issue may still be misunderstood, especially on the service side of BreathCo. As an attempt to address this issue, data was collected about the training that was produced for the ISA, and this had to be reviewed.

On one of the follow up interviews with the end users of the information system application, the service co-ordinator provided an example that people may not be clear on the language that was developed. On inquiring into the communication channels that ISA may now have provided the individuals of the organisation, the service co-ordinator states,

*“people do concerns and they send them and they send them and send them and you phaff on and you go through them and you think, well that wasn’t mine at all. Anyway, they’re just trying to get rid of it, you know, you can have ownership or you can have responsibility or whatever, and you think well that’s not me, that’s the shipping side...”* (Interview with the Service Co-ordinator, December 2004).

It could be thought that individuals who have access to the information system application do not understand the concept of having ‘ownership’ and/or ‘responsibility’. This could be one issue, while the other may be what the service co-ordinator declares are individuals trying to get rid of concerns. The service co-ordinator however, does not state whether the individuals were trying to transfer ‘responsibility’ (for her to undertake a task before transferring it on) or trying to transfer ‘ownership’ and ‘responsibility’. No other evidence was found from the participants to suggest that the language of ownership and responsibility that was developed, was confusing. It may be assumed that most individuals that received the training for the ISA understood the difference in language and the problem could be a cultural one for BreathCo.

Senior management decided to change the title of the project from ‘the customer complaints management project’ to ‘the customer concerns management project’.

What needs to be considered is if the change in title required further attention to be placed on this issue, as it was the team who developed the language for the codes, the models developed, and the language of having ‘ownership’ and ‘responsibility’.

Further dialogue would then be undertaken on what a concern meant in comparison to a complaint, and how this would affect the language, codes, models, and work already being compared. It could be stated that an issue such as this could be providing the end users of the information systems application with problems and has resulted in a technology that is unsuitable. These issues are explored through Figure 7.7 and displayed below in Table 7.6.

Why was the project renamed as the customer concerns management project?	Do you believe this change affected the outcome of the project?
<i>“Complaints sounds harsh, they’re not really complaints that we deal with, they’re more a concern then a complaint and there is like a formal complaint and then there’s just a moan” (The 2<sup>nd</sup> customer services team leader, (link ‘E’) January 2005).</i>	<i>“Yes I think it made people feel better about doing it, the word concern didn’t feel as threatening as complaint” (the 2<sup>nd</sup> customer services team leader, January 2005).</i>
<i>“I think it was just a purely cosmetic thing for the perception of what we were doing, both from an internal point of view and from an external point of view. Complaints sound pretty negative, where as concerns, its not positive feel but its not as negative as complaint, plus we wanted to promote the system we were doing to a customer, you know; if a customer came in to do an audit on us, look this our complaints system, how many complaints do you get? So it’s just got a nicer feel to it the word concern” (The customer services manager, (link ‘F’) January 2005).</i>	<i>“I think it’s opened up the type of things we log. I mean you can probably define what a complaint is; it’s a customer coming on ranting and raving. A customer could come on with what you perceive as a concern, which may not be a big complaint, but he’s still taken the time to lift the phone up and phone us about something. So it’s widened the amount of information we were going to capture through the process” (The customer services manager, January 2005).</i>
<i>“The obvious answer and the standard answer is customer complaints is a, has negative connotations. And we tried to get away from saying customer has complaints. Because in a lot there, there aren’t generally complaints, they are concerns about the service we provide or the product we provide” (The product performance manager, (link ‘G’) January 2005).</i>	<i>“In my opinion I’d say no, but I think across the board generally the response to that would be yes, that it did affect the outcome because I think people viewed it differently. We viewed it at as being everyone’s responsibility rather than one individuals ownership” (The product performance manager, (link ‘H’) January 2005).</i>
<i>“Because complaint has got a negative connotation and a lot of things we deal with are miss understandings, training issues, stuff like that, they’re not necessarily BreathCo’s problem that the customer didn’t listen” (The Quality manager, (link ‘I’) December 2005).</i>	<i>“I’m not sure. I know that it’s being used for example by accounts to track stuff. So I guess may be the change in title did change peoples perception” (the Quality manager, (link ‘J’) December 2005).</i>

Table 7.6

*The Effects that the Projects Change in Title Produced*

Table 7.6 has been constructed to show the reasons why the project was renamed the customer concerns management (CCM) project. Each of the four project leaders gave their opinions on why the project was renamed. The main reason given for changing the title related to how individuals perceived complaints. Complaint conjures up negative attitudes, and one of the reasons uncovered through structuring the problem situation was that individuals may not want to highlight complaints, or associate themselves with complaints. This was one reason why individuals try to pass complaints on. As can be seen in Figure 7.7, individuals may not want to highlight complaints (discussed earlier) and as a consequence it is linked to the change in title. As senior management instigated this change in title, senior management support is also linked to the change in title as shown in Figure 7.7. With this change in title, the project opened up the types of data individuals will capture and can use to improve. A memo identifying the types of concerns being logged at project use is shown relating to the change in title. The final memo that is shown in Figure 7.7, shows the memo relating to perceived individuals who will now use the ISA. With the change in title, it was hoped by the project team that more individuals would be willing to use the information system application, and highlight concerns, as they are perceived less threatening than a complaint. As shown through the analysis at the start of this chapter (see Appendix J), a number of participants who were interviewed were not using the ISA. These participants may still be unsure of what a concern is and what the difference is to a complaint. An example has been demonstrated of this confusion in language for the customer services technical support employee when looking at users of the information system application.

The customer services technical support employee appreciated that customers were not complaining but had issues with products purchased (as this was his job). The employee elaborated that these issues were not complaints, but as the title of the project was now concerns, these issues may not be a concern but more of a training issue. Whether this thinking is correct or not, the employee is not using the ISA and seems to be unsure about complaints and concerns that he receives. The customer services technical support employee believes he receives 'like a comparison', and does not receive either complaints or concerns 'at the moment'. A change in title therefore, with the subsequent emphasis introduced during the training, may have

caused confusion and misunderstandings that individuals are too embarrassed (cf. Argyris and Schön, 1978, 1996) to inquire into. This will briefly be explored.

Service co-ordinator 1 stated she found it difficult defining what is and what is not a concern. In comparison, the service co-ordinator seems to understand that a concern can be everything and this fact is frustrating her, “*I haven’t got my tubes, or I haven’t got any stock of that, or, you know, I was told last week you had this and now you haven’t. Yeah but we’ve got other customers, everything is a concern, everything. I would never get any work done*” (Interview with the Service Co-ordinator, December 2004). This thinking could indicate other individuals may be confused over the issue and language development of concerns, instead of the originally titled complaints. This confusion was only stated by the service co-ordinator. The issue of ‘concerns’ was addressed during the training sessions with this emphasis on the language used consciously within the models, the training, and the title of the project. The problem may be stated that the team thought previous issues did not need to be re-visited. In reality they did, if only for the potential end users benefits, to dialogue and language the issue of a complaint and a concern. As has been pointed out, other models could have been developed and compared.

**Learning Point:** *To develop a language and a shared vision, a team needs people with experience as well as involving potential users of the ISA. These may be the same people. Team members should only participate if they are interested and want to, which can strengthen a community of practice. Nobody should be forced to get fully involved, even though their experience or input may be required at certain points. The project team need to ‘meet’ in some capacity throughout the project if a suitable language is to be developed. When developing systems models, a team needs to undertake this language development through processes all team members are comfortable with. In this research, meeting in a separate room away from the other BreathCo activities was undertaken for certain brainstorming meetings. The language that is developed needs to be communicated to other individuals if they are to be involved with any potential outcome of the work. This is especially important if the language relates to the essence of the project (e.g. complaints or concerns).*

### 7.3.6 Comparing the Models and Implementing Changes

The models that were developed could now be compared to the document and other material produced during stage 2 of SSM<sup>XL</sup>. It was uncovered by collecting the data that a further wish list was created. As a consequence, if any information system application was to be the outcome of the project, it had to be able to satisfy a number of requirements. Whilst not directly relating to the data being collected, this list helped in identifying a potential ISA solution. Even though the EDP manager was responsible for contacting and sounding out perspective vendors, it was the team who had created the wish list and constructed the models. It can be argued that the AIM Venn diagrams compiled, may have helped focus this list, due to demonstrating the many different perceptions participants held on what constitutes a complaint; or now a concern for BreathCo, as well as why a complaint should be solved. These many differing perceptions created awareness about the types of areas an ISA would need to address.

As has been discussed, the project leaders described the change in title as being for the purpose of perception. The only difference stated therefore, was to apply to an increase in the amount of data that could be captured. As no real difference was considered, the models were accepted as being validated and did not require amending. Along with this point, senior management had now enforced a time limit on the completion of the project, and may have forced the models to be accepted, even though they may not have represented an acceptable solution to the problem situation. This is illustrated through the customer services manager, *“just from the point of view really that it could have gone quicker. There was a lot of dragging the heels in the initial stages, a lot of going over the same action lists time and time again, and I think we’ve learnt from that”* (Interview with the Customer Services Manager, January 2005). The customer services manager could have missed the point that due to the change in title and emphasis, important issues could have been missed. On reflecting on the participants interviewed, and who should be using the ISA, it seems that there has been haste to move forward, other thinking was missed and no attempt to inquire into these missed opportunities was made (cf. Argyris, 1999).

The models developed were compared through an overlay approach as described by Checkland (1993). As no ‘system’ was being used formally to handle concerns, what

the models depicted was created through information collected from the information retrieval framework. Undertaking such an approach identified the missing processes required within the models. No formal comparison was undertaken, but models were agreed by the members of the team to provide a solution to the problem of managing concerns. The language of concerns is believed to have been developed successfully enough to be shared through the training with potential end users, and other individuals (e.g., developers) that would become involved in the remainder of the project. Even though an ISA was envisioned for most members of the team, only at this stage can the decision effectively be taken to use a technological solution. The previous chapter (Chapter Six) demonstrated the process the team went through to eventually select Info-Tec. The information systems developer from Info-Tec needed to be brought into the organisation and be placed into the community of practice (c.f. Wenger, 1998; Wenger, McDermott and Snyder, 2002) as well as having to learn and further develop the language of concerns. By achieving this, the information systems developer was able to become part of a smaller community, with the project leaders and the researcher, as the team became streamlined. It is at this stage that action has been taken to improve the identified problem situation and the finish of the framework used.

**Learning Point:** *It is important that sufficient time is spent structuring the problem situation and developing the most applicable models. Individuals of an organisation that do not have much time to undertake certain processes may not want to revisit earlier stages, even though this would be beneficial for the project. This is why SSM<sup>XL</sup> has to be easy to understand and provide tools and techniques that allow participants to identify relevant systems, and develop a language about such issues. A change in language or emphasis may require stages of SSM<sup>XL</sup> to be revisited, but if a team do not see this as important, the solution to the problem situation may need to be revisited at a later stage. The SSM<sup>XL</sup> framework has been designed so this can easily be achieved, but it is argued by developing a shared language, creating a shared vision, team learning, testing mental models, developing personal mastery and utilising systems thinking that issues and changes can be reworked quickly, as well as providing learning opportunities for all members of a team.*

#### 7.4 Discussion

Through the learning theories discussed in Chapter Three, all three theories are argued to have been identified through the first phase of the project. All three learning theories were considered as influencing each of the other two in some way.

Communities of practice (cf. Lave and Wenger, 1991; Wenger, 1998) and Vygotsky's (1978) zone of proximal development is proposed as where learning was undertaken.

Bandura's (1986) social learning theory, and in particular the model of triadic reciprocity, was used to identify how changing particular aspects, of the environment, personal and cognitive factors, and behaviour, could have altered the way the design phase was undertaken. Through discussing these factors, an attempt was made to try and predict what effect changing each would have had on this stage of the project. In this particular case, the way the design stage was conducted seemed the best approach, as it allowed a dialogue and a shared language to develop, as SSM<sup>XL</sup> is designed to do. By exploring this project through the adopted learning theories, it is concluded that if maximum value is to be received from using SSM<sup>XL</sup> teams need to meet each other where visual cues can be picked up. Encouraging participants to come together could allow a community of practice to form where participants can enter the ZPD with each other. If SSM<sup>XL</sup> is to be used successfully, and use is to be made of the learning organization thinking built in, a place should be used where all team members can come together allowing full visual contact. Only by trying to identify these three theories can this observation be made, even though one case is inconclusive to apply this thinking to another organisation.

***Learning Point:** Applying theories of learning, and in particular the three theories used in this study, can allow project teams to identify aspects that may be restricting participation and contributions from required team members. Whilst not being able to prove conclusively that the theories adopted are the most successful, communities of practice and the zone of proximal development can be considered as being where learning is undertaken; whilst Bandura's (1986) work can be used to try to enhance communities of practice and the zone of proximal development to occur. Communities of practice are an important aspect of learning within organisations as they cannot be directed from a management perspective, or the researchers, but are formed through individuals shared interests.*

**7.5 Summary and Learning Outcomes of Using the Soft Systems Methodology  
Expanded for Learning Framework within the Customer Concerns Management  
Project**

In trying to use SSM<sup>XL</sup> within BreathCo, a number of issues were identified through the unstructured problem situation and by attempting to structure the problem situation. These issues related to the operation of BreathCo being too slow, individuals having to constantly be reactive (fire fighting), as well as other operating problems individuals face. These problems may not allow a variety of tools, methodologies or other frameworks to be used to conduct the project. The SSM<sup>XL</sup> framework therefore, had to be used within the backdrop of these problems, and provide a solution to the identified problem situation, which for this project became concerns. Along with these general top-level problems, BreathCo has official, corporate, project management guidelines that are very complex, and seem to be only used for the engineering projects, which is the business BreathCo is responsible for. Projects such as the CCM project did not use official project management guidelines. What is used are processes that relate to the GREAT procedure which is a new concept to BreathCo. The tools available within GREAT, whilst not directly telling individuals how to undertake projects, are perceived to be valuable by a majority of participants. Therefore, how did SSM<sup>XL</sup> help, or restrict focusing and identifying a solution to the problem of customer concerns with an approach such as SSM<sup>XL</sup> having not been used before. Some of these key issues are displayed in Table 7.7.



Advantages	Limitations	Issues Not addressed
<p>The simplicity of the tools used (the rich pictures and the appreciative inquiry method Venn diagrams).</p> <p>Example: “I mean I used this for explaining it to my people and it was very easy to explain as well. I mean the visuals on it were great and I wouldn’t have been able to do anything like this to explain it to them” (Interview with the Customer Services Manager, January 2005).</p> <p>“[Showing the participant the rich picture and AIM report] it’s just so long since seeing this, but yes it was helpful” (Interview with the Product Performance Manager, January 2005).</p>	<p>Using a full participatory approach could let the project lose focus, especially if SSM<sup>xi</sup> is not made explicit. The SSM<sup>xi</sup> framework also has to satisfy other political issues within BreathCo.</p> <p>Example: “Yes I think the way we did it was, as I’ve just explained, by having a huge open forum for input. And what happened thereafter, was the people who were really interested were left at the end. That nucleus was, as I said earlier, was self-selecting. The people who were left were the team, the other people who had fallen by the way side, their input was useful initially, but the core team was left and we said, okay lets do it” (Interview with the Quality Manager and Project Leader’s Interview Transcript, December 2005).</p> <p>“Sort of anything that will have to go through them anyway [senior management]. Anything we decide will have to be okayed by them before anything can be done” (Interview with the Repair Co-ordinator, October 2003).</p> <p>“The customer services manager just asked if I would like complete a form or would I pass it on to somebody else, so I just said I’ll deal with it” (Interview with the International Team Leader (Customer Services), October 2003).</p>	<p>Due to the time pressures the individuals of the organisation were under at the end of 2003, there was no chance to give a talk about the formal use of the Soft Systems Methodology, root definitions, and conceptual modelling as well as formally presenting SSM<sup>xi</sup> developed in this research.</p> <p>If these issues were addressed, how the project team understood and undertook the modelling may have been more or less effective. Recording these outcomes would add value to this research and at the same time, may have enhanced, or reduced the use of the shared language developed and other learning organization theories.</p>
<p>Facilitates the process of exploration.</p> <p>Example: Other aspects of language can be explored with relation to more complex issues such as what one participant stated at an early meeting “What is an actual complaint and what is a perceived complaint?” (Researcher Diary, August 2003).</p>	<p>Time requirements in following traditional SSM as well as SSM<sup>xi</sup> can prove difficult in constructing the conceptual models and root definitions.</p> <p>Example: Referring to the tools the researcher used and the research that was undertaken, “I mean from a time point of view nobody in the company had the time so that was something great” (Interview with the Customer Services Manager, January 2003).</p>	<p>A more in depth investigation upon other systems thinking may have been used. As the organisation is a manufacturing organisation, based upon engineering principles, other hard systems thinking may have also been used to develop the models and brought in through</p>

Advantages	Limitations	Issues Not addressed
<p>Supported in an interview when it was stated, “<i>but iis defining what is a complaint, because a lot of people might think a customer getting their goods late are saying it's a complaint, but it might not be your fault anyway, so its defining what is a complaint, and I think its hard</i>” (Interview with the Repair Administrator, October 2003).</p>	<p>2005).</p>	<p>Stage 4b of SSM<sup>xi</sup>.</p>
<p>More rigorous exploration and analysis than BreathCo would normally do.</p> <p>Example: Discussing the advantages of the informal document that contained the rich pictures and compiled AIM Venn diagrams, “<i>I mean the way it was put together was totally different to anything BreathCo has ever done in the past to the people; it's great I mean. We should learn from this and we should use this as an example for what we do in the future</i>” (Interview with the Customer Services Manager, January 2005).</p>	<p>People will only use processes that they are used to using.</p> <p>Example: “<i>But I think it's probably since we've gone with the GREAT practice as it formalises the procedures</i>” (Interview with the Customer Services Manager, January 2005).</p>	<p>Not revisiting stages 2, 3 and 4 when the title of the project changed, was a limitation, as other processes may have needed to be taken into account. Even though the project leaders perceived the emphasis was still the same, this was not investigated further. Better insights therefore, into what particular IS was required could have been obtained.</p>
<p>Highlights many different subjective perspectives that move from being tacit to being more explicit.</p> <p>Example: “<i>Well one was should we acknowledge receipt of every concern to a customer. I for one thought we should, but our customer services people didn't. There were a few opinions that lack of understanding, certainly from my part. I didn't understand the commercial aspects of our operations, but once I understood all that</i>” (Interview with the Quality Manager, December 2004).</p>	<p>Nobody to ask questions or seek guidance from when exploring further use of SSM<sup>xii</sup> if used again in another project.</p> <p>The dependence on an expert can be seen through the following examples.</p> <p>Discussing the developer from Info-Tec, “<i>well he was an integral part of the team</i>” (Interview with the Quality Manager, December 2004).</p> <p>Again discussing the developer “<i>oh yeah, a major input into the design of the system</i>” (Interview with the Quality Manager, December 2004).</p>	<p>The effect of not going back to show a number of constructed root definitions developed from the CATWOE analysis presented in this chapter to the participants. Using this approach to then allow participants to construct the models from the informal document would add value to this research.</p>

Advantages	Limitations	Issues Not addressed
<p>Contributes innovative ideas to solving problems.</p> <p>Example: <i>“The project was justified by the fact that we knew people were dealing with issues that weren't being bottomed out. The only thing to do was to capture all the data to do the analysis and attack the route course of the problems. So that was the justification, we weren't very efficient”</i> (Interview with the Quality Manager and Project Leader, December 2004).</p> <p>By identifying the problem situation and helping to structure the problem situation, provided a number of learning opportunities for the participants, the researcher for this research, and both the participants and the researcher about the project. Through the continuous cycle of learning and the tools to undertake this task</p>	<p>This is supported by the Customer Services Manager <i>“what suggestions I don't know because I don't think we could have come up with it ourselves”</i> (Interview with the Customer Services Manager, January 2005).</p> <p>Other examples include appreciating the help and experience of the researcher.</p> <p><i>“Erm, I think what's nice actually going back to the previous two, having your self involved with it, it was a bit different from what we've normally had in the past”</i> (Interview with the 2<sup>nd</sup> Customer Services Team Leader, January 2005).</p> <p>And finally, <i>“I think because you know computers and you know the systems, and I think with you going around helping other people in other companies, your input was valuable to give us some ideas, and obviously directed us how to change things and where to look”</i> (Interview with the 2<sup>nd</sup> Customer Services Team Leader, January 2005).</p>	
		<p>How removing the co-operative emphasis argued for as being a suitable method in designing and implementing an ISA, and using only a participatory action research method that other client led design research promotes (see Stowell and West, 1994; West, 1995).</p>
		<p>Flow modelling and screen design models were the only models used. How other participants in another research site would accept such models</p>

Advantages	Limitations	Issues Not addressed
<p>allowed other organisational processes to be brought to the attention of the researcher. These processes may be an issue that all other participants may or may not be aware of which could be un-discussable. These processes could also challenge participant's mental models.</p> <p>Example: <i>"Through talking to the sales staff about the re-organisation, an impression was obtained of not being happy with the planned change"</i> (Researchers Diary, August 2003).</p> <p><i>"The main problem seemed to be centred on purely finding a solution to the problem and not defining or exploring customer complaints"</i> (Researchers Diary, October 2003).</p>		<p>is unknown and can result to the perceived usefulness SSM<sup>2d</sup>.</p>
<p>The models and other data that were decided to be collected were meaningful to the team and could be easily communicated.</p> <p>Example: <i>"[brainstorming] that was the main tool really, just brainstorming it. Going through process flows, and stuff like that. I mean it was changed on a number of occasions through the brainstorming exercises"</i> (Interview with the Customer Services Manager, January 2005).</p> <p><i>"It was just flow charts and things like that. I think it was just from previous designs isn't it, you know, we just, the flow charts wouldn't be much different from other flow charts we'd used"</i> (Interview with the 2<sup>nd</sup> Customer Services Team Leader, January 2005).</p>		

Table 7.7

*Advantages, Limitations and Issues not Addressed through the Use of the Soft Systems Methodology Expanded for Learning Framework*  
Adapted From: Small (2005)

Table 7.7 has laid out the advantages, limitations, and issues not addressed in using SSM<sup>XL</sup> to help explore the problem of complaints/concerns at BreathCo. It could be argued that the advantages received could have been achieved through using traditional Soft Systems Methodology, as described by Checkland (1993), Checkland and Scholes (1990), and Avison and Wood-Harper (1995). This statement will be debated within this final section and will show that this would not have been the case, even with the limitations of SSM<sup>XL</sup> highlighted. Thorough using SSM<sup>XL</sup> a number of learning points have been drawn out and will be presented again as the findings of this first cycle of action research. These can be seen in Table 7.8 below.

Point	Learning Point Drawn
1	<p>In order for the benefits of any technology to be reached by individuals of the organisation, the individuals have to interact with the ISA and use it. If individuals are not using the technology, a process may need to be implemented to help manage this process. As individuals are not using the technology as planned, the problems may have resulted, as Argyris (1999) states, through design. These issues also have to be taken into account and revised if necessary. The design process of any ISA therefore could relate to the learning activities that can be achieved from the technology in the future.</p>
2	<p>In order to use SSM<sup>xi</sup> there needs to be time set aside to use the approaches and techniques the framework has to offer. If this time cannot be found the framework may not be as valuable as it could be. With the many different perspectives surfacing through the un-structured problem situation, a variety of tools (e.g., the AIM and rich pictures) need to be used to help structure the problem situation.</p>
3	<p>Individuals who have knowledge and experience can help other individuals who do not have such knowledge and experience, learn more quickly about issues that are relevant to the area of concerns. This is important if individuals have only a limited time to implement a process. This learning is argued to be taking place in this team through Vygotsky's (1978) zone of proximal development as individuals made other individuals aware of processes and other issues that needed to be taken into account.</p>
4	<p>The project developed a community of practice of sorts, due to senior management selecting 'Quality' to undertake the project. It may be debated that this was not a community of practice in the traditional sense as described by Lave and Wenger (1991) and Wenger (1998). With the project leaders committed to improvement in general, and other participants being invited to contribute and not being forced, a community could develop. It is proposed that the stronger the community of practice developed, the easier it is for participants to enter into the zone of proximal development where further learning could be undertaken. This is considered, as participants would be more willing to commit to the learning being undertaken. Communities of practice cannot be directed but need to be encouraged especially in undertaking projects where a variety of expertise and skills are valuable, such as designing and implementing ISA.</p>
5	<p>The use of SSM<sup>xi</sup> for the BreathCo project has helped other organisational problems surface that could also now be addressed. Individuals and other organisations however have specific ways of working and conducting projects (e.g., brainstorming meetings). It was important that SSM<sup>xi</sup> can take these ways of working into account. The tools used of AIM and the rich pictures were deemed valuable by the four project leaders in communicating different perspectives of the same problem. The SSM<sup>xi</sup> framework has been designed to be used with other individuals; therefore, it is important that the perspectives of the participants are incorporated, as it is these individuals who will be the beneficiary and users of the solved problem situation.</p>
6	<p>It is not always feasible in a business environment to take a substantial amount of time away from key tasks, as shown through the problems that employees of BreathCo face, unless it is very important. Formal root definitions and conceptual models therefore, can be difficult to undertake in some cases, especially if a workshop is not set aside to develop these models. Other tools such as the AIM Venn diagrams and Rich Pictures may be able to assist in this task, but they have to be able to provide communication, debate, and questioning. If a discussion can be initiated, it can be the first step in creating a dialogue, which will then form the language required to undertake a project as the theories of the learning organization try to emphasise.</p>
7	<p>Some form of modelling is required to propose various solutions to a structured problem situation. Soft Systems Methodology uses CATWOE's, Root Definitions, and Conceptual Modelling, but it is not always possible to undertake them. This project used an information retrieval framework that worked well as it considered potential user's perspectives and flow-charted what the potential solution should achieve. Alternative tools therefore, could be used to take a systems perspective, even if not formally undertaken, if individuals of an organisation cannot spare the time. It needs to be remembered that using traditional SSM approaches will provide more accepted processes (e.g., root definitions and conceptual models) to a project team but as long as the approaches used have the same emphasis in identifying human activity systems they could be used.</p>

Point	Learning Point Drawn
8	To develop a language and a shared vision, a team needs people with experience as well as involving potential users of the ISA. These may be the same people. Team members should only participate if they are interested and want to, which can strengthen a community of practice. Nobody should be forced to get fully involved, even though their experience or input may be required at certain points. The project team need to 'meet' in some capacity throughout the project if a suitable language is to be developed. When developing systems models, a team needs to undertake this language development through processes all team members are comfortable with. In this research, meeting in a separate room away from the other BreathCo activities was undertaken for certain brainstorming meetings. The language that is developed needs to be communicated to other individuals if they are to be involved with any potential outcome of the work. This is especially important if the language relates to the essence of the project (e.g. complaints or concerns).
9	It is important that sufficient time is spent structuring the problem situation and developing the most applicable models. Individuals of an organisation that do not have much time to undertake certain processes may not want to revisit earlier stages, even though this would be beneficial for the project. This is why SSM <sup>XL</sup> has to be easy to understand and provide tools and techniques that allow participants to identify relevant systems, and develop a language about such issues. A change in language or emphasis may require stages of SSM <sup>XL</sup> to be revisited, but if a team do not see this as important, the solution to the problem situation may need to be revisited at a later stage. The SSM <sup>XL</sup> framework has been designed so this can easily be achieved, but it is argued by developing a shared language, creating a shared vision, team learning, testing mental models, developing personal mastery and utilising systems thinking that issues and changes can be reworked quickly, as well as providing learning opportunities for all members of a team.
10	Applying theories of learning, and in particular the three theories used in this study, can allow project teams to identify aspects that may be restricting participation and contributions from required team members. Whilst not being able to prove conclusively that the theories adopted are the most successful, communities of practice and the zone of proximal development can be considered as being where learning is undertaken; whilst Bandura's (1986) work can be used to try to enhance communities of practice and the zone of proximal development to occur. Communities of practice are an important aspect of learning within organisations as they cannot be directed from a management perspective, or the researchers, but are formed through individuals shared interests.

Table 7.8

*The Learning Points Drawn from the First Cycle of Action Research within BreathCo*

From the points stated in Table 7.8, the main discussions on SSM<sup>XL</sup> can now be undertaken.

The main problem in the BreathCo case came from making SSM<sup>XL</sup> explicit. This was similar to how Checkland (1993) and Checkland and Scholes (1990) have used SSM in the past, with individuals within organisations who may not fully understand the approach. Therefore, by using SSM for the CCM project, as has been highlighted through using SSM<sup>XL</sup>, the outcome was similar. Checkland (1993) and Checkland and Scholes (1990) use a method of action research to overcome this problem. Through an approach of pure action research, they have been able to take a large amount of control in the research process. As this was not the aim for this research through the co-operative nature of the methodology declared, SSM<sup>XL</sup> was used as a way to think about exploring problems, IS design, and the learning that could be achieved. Using SSM<sup>XL</sup> in this way provided the first limitation displayed in Table 7.7.

The limitation was identified as the researcher was not formally leading the participants. Individuals therefore, could move the project in different directions or propose to undertake the project from a more objective stance. If this was achieved, it could reduce the chances to explore the problem situation formally, or take time to discuss any models developed. Any project that wants to use SSM<sup>XL</sup> has to take the time to undertake the investigation and modelling stages, so they can be compared with the 'real world'. This did not seem to be a problem for the participants of BreathCo. This may be through the tools used to help facilitate this process. The use of AIMs Venn diagrams and the rich pictures proved popular, as they were simple to use, explain, and start a dialogue upon. It is processes such as these that were aimed to draw out learning organization thinking, that could be built on in the modelling stages. Whilst this happened with BreathCo, it was the researcher at the participant's request that helped the participants focus these issues. How the participants would undertake a similar project in the future, if suitable expertise was not available and the framework not being made explicit, is unknown. What was uncovered within the data is that the participants stated they could follow the same processes and use the tools again. One outcome of the research can be stated as making SSM<sup>XL</sup> explicit to all participants.



If SSM<sup>XL</sup> could be made explicit, it may overcome the co-operative inquiry problem of not being able to force certain issues on the participants, as they would have SSM<sup>XL</sup> to work to, and hopefully not drift off from the issues that need to be focused upon. In order to do this, it may be necessary to make a formal work book that participants can use and refer to on using this SSM<sup>XL</sup> framework. The tools of rich pictures and the AIM Venn diagrams can be used, or the full appreciative inquiry method as set out by West (1995). This could further increase the possibilities of participants constructing CATWOE's and formal root definitions, as a chance to explain how these tools work and the benefits behind them, could be undertaken either verbally, or through written text. Other tools could then be used in conjunction with SSM<sup>XL</sup>, similar to how GREAT and the tendency to brainstorm and flow model processes are used at BreathCo. The main problem with this however, is the time factors involved. This was one of the factors uncovered through using SSM<sup>XL</sup>. The issues were a problem for BreathCo employees, and it was argued that SSM was useful in comparison to ETHICS, which requires work shops that enables participants to learn the approach.

At the start of this chapter, a table was developed to show what learning theories were argued to have been located with this aspect of the research. At the design stage where SSM<sup>XL</sup> was being used, all three theories of learning (social learning theory, the zone of proximal development and communities of practice) are argued to have been identified. Throughout this chapter the theories have been discussed. Trying to identify such theories has been valuable in a number of ways. Firstly, SSM<sup>XL</sup> calls for participation from individuals of the organisation. This can relate to social learning, as participants need to come together. Whilst this may be trivial, it is argued how these 'comings together' are undertaken, can allow learning to be undertaken or restrict learning from taking place. Identifying how the participants of BreathCo interacted together over issues of the project, highlighted the suitability of firstly SSM<sup>XL</sup> in general, secondly, the tools and approaches being used and finally, how the project was being conducted. The outcome of exploring these issues instigated discussion on what alternatives could have been taken. This discussion is argued to have shown the value in exploring the process from this perspective and its ability to allow further learning activities to be achieved.

Whilst the debates that surround the interpretation of the zone of proximal development continue within the literature, the approach is considered to have helped participants transfer their mental models and knowledge to other participants. Doing this allowed more of a dialogue to commence on key issues. For example, through use of the tools and the models, issues not previously acknowledged or discussed were drawn out. Participants could have chosen to ignore any differences highlighted and proceeded to push the project through to completion. This did not happen, as the learning being created by all participants was deemed valuable to both the participants and for the project itself. The learning potential the framework is trying to enact has increased, through trying to identify instances of the zone of proximal development within BreathCo, and how this was undertaken.

The final theory of learning adopted and argued to have applied to the design of the CCM project, considers communities of practice. Whilst the description and processes that make up a community of practice is diverse and entwined, arguing for the existence of a community in its truest sense may not be possible. What is important is what a community of practice aims to achieve, so trying to identify characteristics of a community is important. If the literature on communities of practice is right, it is the participants that could form a community who are the most willing to engage in learning activities, as they are part of each participants practice. It is these individuals who will find the most value in the SSM<sup>XL</sup> framework. If participants can be identified who show these characteristics, the framework can be used as a process to help draw out and enact these learning activities, through the design and implementation of an ISA. As was identified in the BreathCo case, a number of participants showed the characteristics of a community of practice and were interested in what the CCM project offered, even if this was part of their role. Other individuals were less interested, and while their participation was important, they could move from the centre of the community to the periphery as the project moved forward and further learning was achieved.

This finishes the analysis on the use of SSM<sup>XL</sup> and the first cycle of the action research. The second cycle of the action research investigates how the outcomes of SSM<sup>XL</sup> were used to implement an ISA. Whilst the use of the information system application has been summarised at the beginning of this chapter, the final part of the

analysis for the BreathCo case relates to the implementation of the ISA and training issues. By specifically exploring these issues, it is hoped further learning opportunities are identified. To accompany this process, it is also hoped any issues that have arisen and have resulted in end users not using the ISA, as has been highlighted at the beginning of this chapter, can be identified. It should be pointed out that this part of the research did not use a framework to help guide the study, but let the data emerge from practice. The outcomes of the next chapter are hoped to highlight key issues that need to be considered in future projects. For identifying any issues uncovered, a second framework could be developed and joined with SSM<sup>XL</sup> to make a learning framework for the design, implementation, and management of information system applications.

## Chapter Eight: Implementing and Managing an Information System Application with an Emphasis on Learning

### 8.0 Introduction

The practical work highlighted the success and the limitations of using SSM<sup>XL</sup> within BreathCo. The SSM<sup>XL</sup> framework was used to help explore the problem of complaints/concerns, and from this, identify and specify the information system application(s) (ISA) that may be required to tackle the problem. Once the project moved past this phase, no other theoretical approach was adopted. Whilst SSM<sup>XL</sup> was used to formally identify the use of an ISA (the concerns technology); the second cycle of action research that was undertaken within BreathCo did not use such a framework. How the team at BreathCo implemented and managed the concerns technology, and the learning that such approaches can present, emerged through a more grounded approach. These issues which were identified through the primary research, are focused upon in this chapter.

This chapter investigates BreathCo's implementation and management processes in relation to this particular information systems development (ISD) project. In order to do this, the main form of data collected was interviews (see Appendix H). The participants that were interviewed regarding this aspect of the research firstly, represented individuals who were involved in the implementation process (the four project leaders) (see section H.3 of Appendix H for the interview structure). Secondly, the ten participants who were identified as potential end users of the ISA (see section H.2 of Appendix H for the interview structure) were also interviewed. The ten participants are the same individuals whose interviews provided an overview of the customer concerns technology and its usage (see Appendix J). The purpose of these interviews is to generate different perspectives and opinions on the issues associated with the ISA. The outcome of this analysis provides learning points that are argued to be important in IS implementation and management. This chapter examines four issues that have been identified through the primary research, namely:

- The implementation approach

- Training
- Further implementation, maintenance and use issues associated with information system applications
- Information System Application Management issues

This chapter begins by focusing upon the different approaches the customer concerns management (CCM) project could have taken in order to be implemented.

### **8.1 The Implementation Approach**

This chapter begins by, reviewing what the participants of the team did when getting to the final stages of SSM<sup>XL</sup> and moving to the more structured aspects of ISA projects. This related to the use of an information systems developer from external to BreathCo, to help develop the technology. Other issues focused around the training of other individuals within BreathCo, in relation to how the ISA should be used. Once the process reached the final stages of SSM<sup>XL</sup>, in the terms of the project leaders, the team (or has been argued the community) was streamlined. Reducing the team therefore, could be considered as ending the community that had been developed to investigate the problem of customer complaints/concerns. This may not be so for the following reasons; considering the work of Lave and Wenger (1991) and Wenger (1998), participants in a community can be at the heart of the community and drift to the periphery of the community or leave all together, whilst new members enter the community. It could be seen that participants of the team drifted out of the community, whilst the IS developer joined on the periphery and moved into the heart of the community, as more prototypes and understanding with the project leaders was built. How an IS specialist, or in the BreathCo case, the developer could become part of the concerns community; but at the same time allow the participants to dialogue and discuss the important issues, whilst not being distracted by technological factors ought to be focused on.

#### **8.1.1 Balancing the Power of Using an Information Systems Specialist**

The outcome of SSM<sup>XL</sup> was to develop an ISA. There were various options open to the team on how this could be done. The consensus of the team was to use an IS specialist to work in conjunction with the team to implement the technology.

BreathCo's computer department (EDP) had already tasked a Lotus notes

development company to implement another ISA solution within BreathCo previously. Because of this history, a meeting was proposed to investigate if the company could help. This meeting was how the IS developer became involved with the project. The Quality manager states, *“we discovered that there was an organisation dealing with gas detection who use a Lotus Notes system, that develop Lotus Notes systems. So we asked”* (December 2004). The other two project leaders supported the project leader’s statement apart from the customer services manager who was unsure how the IS developer got involved, as he was away on other BreathCo business at the time. Along with the IS developer entering the community on the periphery, were the EDP department (who will have to support the ISA once implemented for all BreathCo employees), the project leaders, and the researcher. How the smaller team (or community as it has been identified) would undertake this implementation phase needs to be explored. This is important, as the process could create an appropriate learning environment where a suitable ISA could be implemented. The Quality manager did not seem worried about the implementation of the ISA, or the team being reduced by adding, *“well it’s not uncommon for a small team to drive things in my experience. So we were confident that the system would add value”* (December 2004).

The customer services manager could be argued to support the perspective that participants in the community were moving when he expresses that *“it came as a natural progression from the initial team we had, and this was part of the reducing down of the team. I think we were the key individuals on the larger team, so it wasn’t a new selection at that time it was just taking the team forward...”* (January 2005). Taking the team forward now involved the IS developer. The project team had envisioned how the problem would be solved, technology was identified as being required, and the IS developer from Info-Tec was the person to develop the ISA. The problem as has been identified within the literature review is that, it could be difficult to change what is developed once implemented. From a technological and cultural perspective, the project team understanding what needs to be implemented becomes important. Whilst the use of SSM<sup>XL</sup> helped the team realise such issues, they needed to communicate these to the IS developer. The developer (the IS specialist) therefore, with his knowledge of ISA, needed to understand the project team’s issues, as well as share his expertise with the team. In doing so, a suitable dialogue could be

maintained with the language of concerns being further enhanced, incorporating the thinking of an IS specialist. It was important how the team undertook this task. The zone of proximal development could be used as a way to explore this process.

**Learning point:** *It is important that the community is kept alive; as it can be easy for a project team to allow an IS specialist to develop what he believes would be the best form of ISA. The project team need to encourage regular meetings and dialogue so they can be involved in all stages of the project, even though they do not have the expertise to develop the technology themselves.*

In order for the project team and the IS specialist to be able to enter the zone of proximal development, just like the design meetings, a place where the plans for the project can be discussed had to be found. The IS developer made several trips to the BreathCo site for the meetings, even though Info-Tec was located in the South of England. Meetings were held in one of the new purposely-built conference rooms in the new building that had been constructed. Within the meetings, dialogue and language was developed with the IS specialist. How did the participants therefore, think this approach worked in practice? The Quality manager explains,

*“well he was an integral part of the team [the IS developer]. We had everything flow-charted and we had several continuous development meetings with Info-Tec, so different development levels we would try out. The core team would put some pilots on and then feedback into the developer...”* (December 2004).

The product performance manager sees the techniques used with the IS developer as not being unusual for a project such as this. He declares *“through direct verbal communications in meetings at BreathCo. And I think it’s not an unfamiliar type of format that Info-Tec have dealt, or haven’t dealt with before. I think it’s a familiar type of format that other people use, because it’s just logical”* (January 2005). Whilst not present at the early development meetings, the customer services manager accepts the models were presented to the IS specialist through the manager of EDP,

*"I'm not exactly sure, I missed a couple of the meetings when the developer was in \*\*\*\* [EDP manager] would have been sort of key from our EDP department in doing that, but I missed out on a couple of the meetings but I got involved in the later stage where I said what about this, what about that, what about the other, so there were a few things missed out"* (January 2005).

It could be summarised that the participants were comfortable with this format and were able to contribute to the development of the ISA. By looking more closely at this process, it can be argued that the meeting formats allowed participants to enter the zone of proximal development (ZPD). This will now be investigated.

The 2<sup>nd</sup> customer services team leader whilst not explicitly stating how the models were presented to the IS developer, keenly described processes that could be described as entering the zone of proximal development. *"He did have a lot of input when we suggested things, he sort of related it back to us in a way that we would understand and how we could change things if we were asking for something that was going to be too complicated, or too costly he would advise us, you know"* (Interview with the 2<sup>nd</sup> Customer Services team Leader, January 2005). The product performance manager agreed, *"yes I'm sure, again I couldn't be specific but thinking about the meetings we had, I'm sure the developer did, because it's a familiar concept he brought to bear things that from his experience would work better etcetera within the system"* (January 2005). The Quality manager almost echoes the product performance manager and 2<sup>nd</sup> customer services team leader by stating, *"oh yeah a major input into the design of the system. More input on the business side, he was quite useful because of his experience with other organisations"* (December 2004). The customer services manager provides the clearest indication, but is impossible to conclusively prove, that learning had occurred through entering the zone of proximal development by stating, *"I would imagine he would have. What suggestions I don't know because I don't think we could have come up with it ourselves"* (January 2005).

Whilst the IS specialist had the knowledge to undertake the development, it was important that he passed some of this on to the project team, where they could then enquire and make other relevant suggestions on what they had now learnt. This in turn increases the likelihood that an ISA would be implemented that would be



acknowledged as being suitable for the participants, other individuals, and BreathCo. Whilst this is an advantage to the project, the learning cycle that has been created by undertaking the work in this way should not be underestimated. It can often be seen at this stage that an IS specialist would take the models and re-appear once the ISA had been developed. This did not happen in this project. What can be learnt from the approach adopted for this study is laid out below.

***Learning point:** The zone of proximal development can be a useful approach to investigate the conversion of models and other illustrations into a language in conjunction with an IS specialist. This is argued as participants who have the knowledge on how to accomplish specific tasks and participants who do not yet possess such skills. Through the zone of proximal development, participants of BreathCo can help the IS specialist learn about issues required within the concerns technology. The IS specialist can then convert the plans for the development of the technology back to the participants. This process can allow the participants to remain involved in the design of the ISA, which forms a continued participative approach and learning cycle.*

Prototyping took place in the development phase. As each revision of the ISA was undertaken, the community, as it has been argued, would undertake the testing. From the outcomes of the prototypes, further recommendations were identified where further learning could be achieved. The learning would then be brought to the meetings with the IS developer, which further strengthened the community, as all participants were able to take part in the meaning, practice, community, and identity that was being created, through undertaking the project in this way. On average, six revisions of the technology were undertaken (participants stated 4 to 8 depending on what you would class as a revision) to reach a stage where the ISA could be rolled out and implemented into the organisation. Whilst the development was underway, a training package was being constructed. The training was important, as it would be the first chance for other individuals to see the ISA and the advantages or limitations this would provide to their jobs within BreathCo. How this information would be communicated is important. The theories of learning adopted can be used to investigate how successful it can be to conduct the training in a specific way.

## 8.2 Training

As has been described within Chapter Six, the training was designed to be practical in nature. With this practical nature, it is argued the outcomes of such approaches, can be looked at through the lens of the learning theories of Bandura (1986) and Vygotsky (1978). Investigating these particular theories can allow an inquiry into why the project team perceive that this was the best approach to take. A network within ATLAS.ti has been constructed to contemplate this process, with the learning points being drawn out in a Power Point slide, as described within the data presentation section in Chapter Five. This network is shown in Figure 8.1.

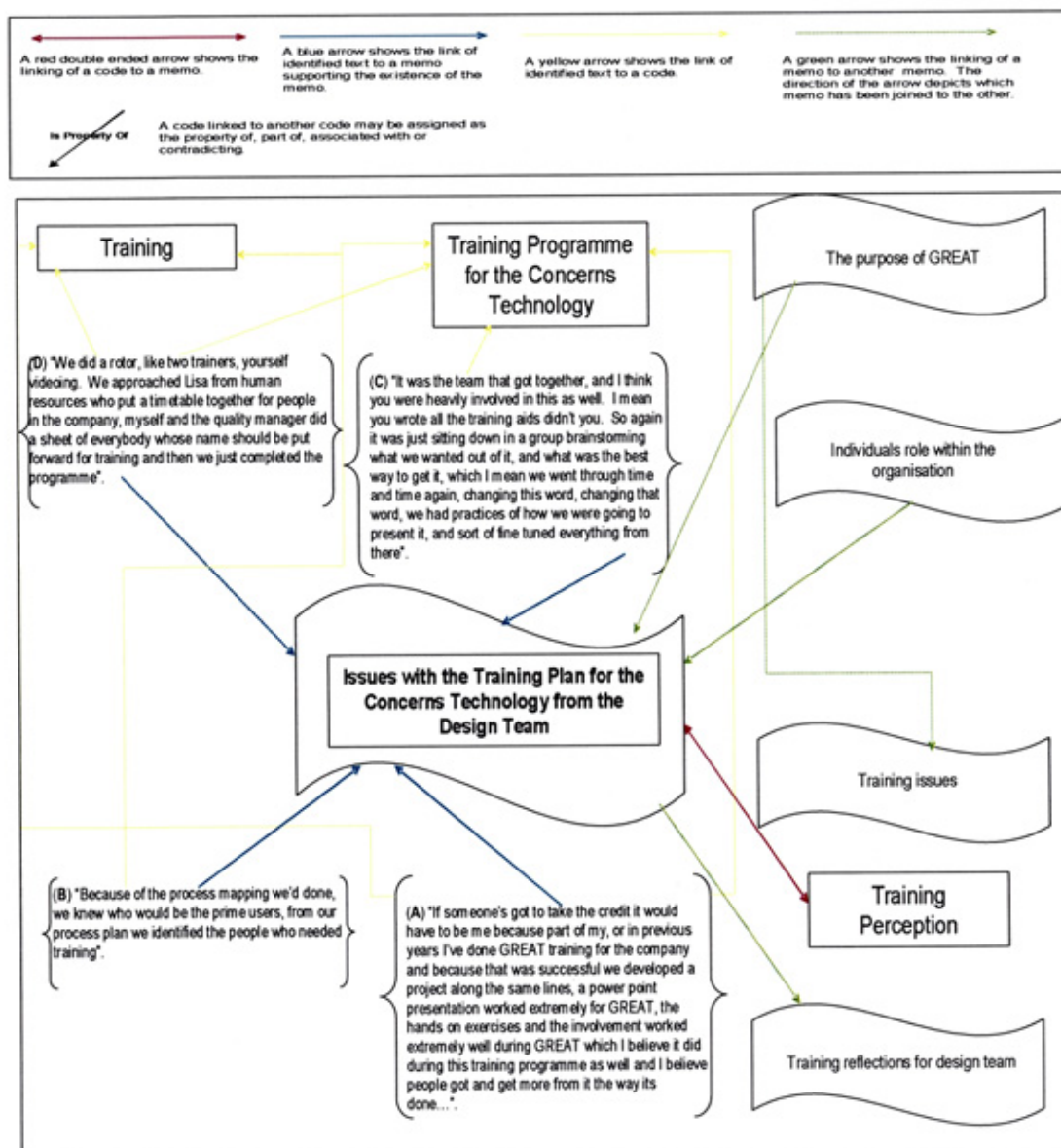


Figure 8.1  
Developing the Training Plan

Figure 8.1 demonstrates why the participants (the project leaders) undertook the training in the way that was most suitable, as shown through links A to D (the product performance manager (link 'A', January 2005); the Quality manager (link 'B' December 2004); the customer services manager (link 'C' January 2005); and the 2<sup>nd</sup> customer services team leader (link 'D' January 2005)). These points show the differences in opinions on issues with training, demonstrating that training is not a trivial process that can be overlooked.

With the focus on providing training with a practical element in mind, the learning theories can be seen through how the training was conducted (Bandura's (1986) work on how personal, behavioural, cognitive, and environmental factors can influence participants) as well as the contact the trainees were able to have with the trainers, and each other, which can relate to Vygotsky's (1978) zone of proximal development due to more capable individuals helping other individuals learn about the concerns technology. The training was held in one of the new conference rooms in the new building. Bandura's (1986) theory could be argued to apply as the room was away from the usual activities of BreathCo. The messaging tannoy that regularly operates throughout the BreathCo site, could also not be heard, so full concentration could be maintained. By undertaking the training in this way, the intention was to try to influence the environment. The environment can be perceived as relaxed because trainees could see the Power Point presentation directly in front of them, as well as on a laptop where the practical element of the course would be undertaken.

It could be debated that this environment encouraged trainees' behaviour and personal and cognitive factors to embrace the course, ask questions, and learn how the ISA could help them within their job role. The course could have been conducted electronically, where each identified trainee learned about the information system from their own computer within the environment of general BreathCo activities; or all trainees could have been trained at once in one big room. Although these alternatives are not practical, they emphasise the different approaches open to the project team that could have affected trainees' environments, behaviour, personal and cognitive factors. Discussing how the project team constructed the training is important. How the training is considered by the participants who have been identified as potential users of the ISA, needs to be examined. The training was the first opportunity that

potential users would have to be able to interact with the information system, and could have shaped participant's perception. It should be remembered that these are the participants who were interviewed and who were shown not to be using the ISA frequently, by the data drawn out through the earlier analysis.

**8.2.1 Training Issues Drawn from the Identified Users of the Information System Application**

The participants identified as non-users of the ISA were drawn on to examine the issues of training (the research and design employee, the Quality managers PA, the customer services technical support employee, the Quality employee and the purchasing employee) (see Appendix J Tables J.1 and J.2). All participants stated the venue was suitable. Their acceptance for where the training was conducted could be identified through Bandura's (1986) learning theory, had it been seen that if the venue was seen as unsuitable and had contributed to the lack of use of the ISA. It could be argued that the participants had been put off the technology, and as a consequence the participants had not being prepared to learn how to use it. This does not seem to be the case. As has just been illustrated, the identified non-users all expressed the venue was suitable. The venue where training is conducted can be important, in this instance it was considered good. All the participants identified as users of the ISA supported the non-users in acknowledging the venue as suitable. Constructing the training in such a way, allowed trainees to enter the zone of proximal development (cf. Vygotsky, 1978) with the trainers. This occurred through questioning. Help from the trainers could be engaged more effectively than if the training was constructed in one of the alternative examples given.

By taking account of the selected learning theories, the training was developed in the most suitable way for this particular project. If the participants indicated the training was unsuitable, this could be seen as a contributing factor to the low usage that was uncovered. The learning point from training issues is given below.

***Learning point:** Training is an important aspect in implementing an ISA. As training is undertaken for the purpose of instructing how trainees are to use the technology, and get benefits for themselves as well as other members of the organisation; this stage should not be overlooked. The learning styles of individuals become very important, and therefore need to be taken into account. Hands on experience, is especially important with ISA, which is argued through using Bandura's (1986) learning theory as being able to enhance the process. Exploring personal, behavioural, and cognitive factors, as well as environmental factors, could enable trainers to identify any limitations a training plan contains and correct this allowing a more suitable learning environment to emerge. The training programme could be used to help enter the zone of proximal development with the individuals who have the knowledge about how the technology works, and should be used as they helped design it. The participants involved in implementing the technology, should be involved in helping develop a training programme.*

#### 8.2.2 A Summary of the Training Programme from all of the Interviewed Participants

A question was put to the participants in connection with if they could sum up the training they received. The result can be seen in Figure 8.2. Surprisingly, the answers given to the network displayed (Figure 8.2 below) to investigate this summary, does not fit the expected pattern. These differences are shown through links A to C (the customer services technical support employee (link 'A' December 2004); the purchasing employee (link 'B' December 2004); and the research and design employee (link 'C' December 2004)). These statements show that the training could be considered as good in general. One issue with the training came from the service co-ordinator (link 'D'). The service co-ordinator could not remember attending the training course. By reviewing the training videos recorded and the training register taken, it was clear to see that the service co-ordinator did attend the course. It is unknown why the service co-ordinator could not remember. Whilst only a moderate user of the ISA, she does use the technology and finds it straightforward. Reasons can only be speculated for this ranging from the number of job commitments having been undertaken, meaning this course did not specifically stand out, to the training course not being comprehended as difficult, and therefore she did not remember completing it.

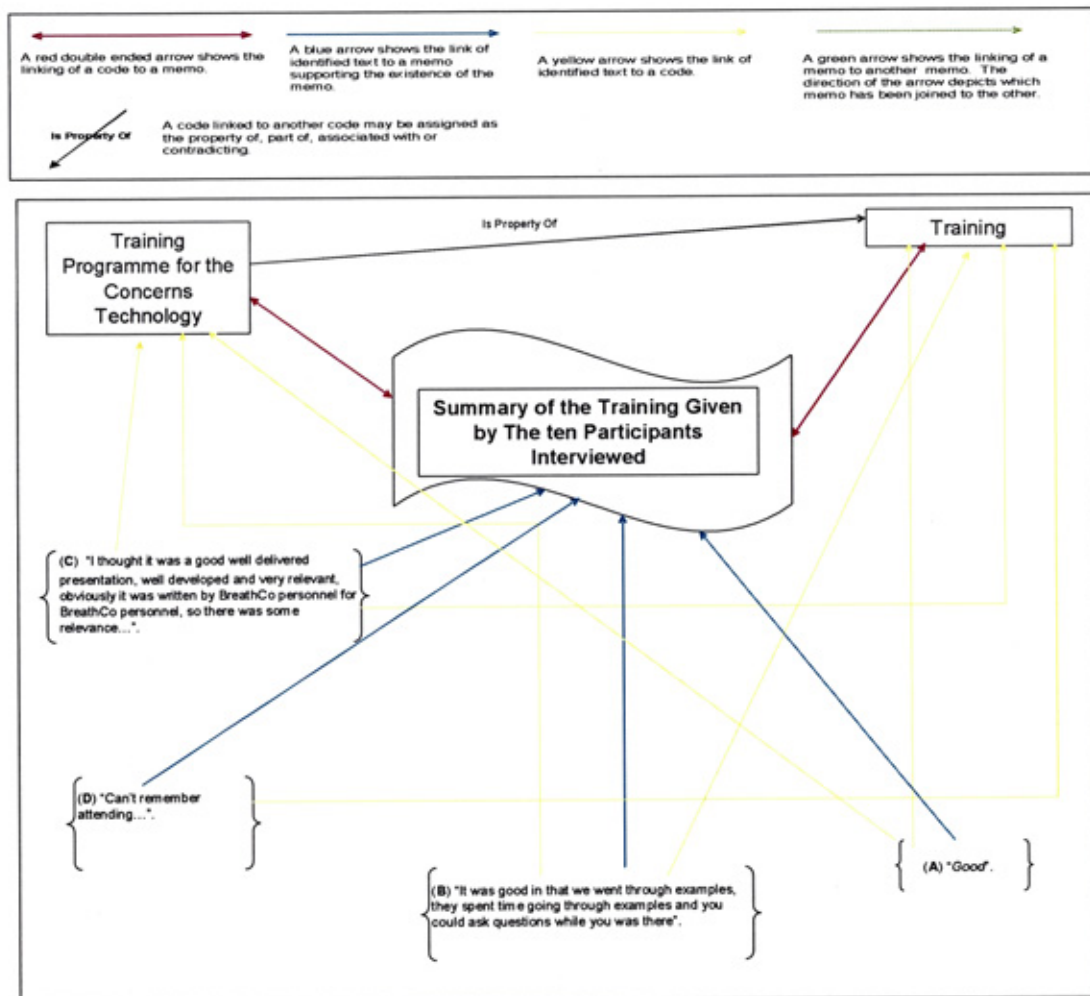


Figure 8.2  
*Summary of Training Given from the Trainees*

Other points can be summarised as too many trainees are attending the course (Service Co-ordinator 1) and the requirements of more training (the Shipping Supervisor). These opinions could be argued to show the usefulness of Bandura's (1986) and Vygotsky's (1978) theories as firstly; the environment was deemed as unsuitable by the service co-ordinator. Secondly, additional contact was sought with more able individuals by the shipping supervisor. This point could be further supported by the other trainees when asked who they would seek out for advice or help in the future. All responses looked towards either one or two of the trainers/project leaders. The reliance on the trainers could show either an easy way to get help, or that the trainers' knowledge of how the ISA works is valuable, and is another reason to suggest that any participant involved in the design of any ISA should be involved in the training of it. Vygotsky's (1978) work about the zone of

proximal development could be used as a way to see how a training plan could be constructed, whether agreed with or not.

Other positive issues identified included:

- Having traceability (The Quality Employee).
- Reducing costs (The Customer Services Technical Support Employee).
- Checking that a customer was dealt with in a timely manner (The Research and Design Employee).
- Visibility of concerns, so if an employee is away they can still be dealt with (The Shipping Supervisor).

Whilst these points are all positive, participants also stated a number of negative comments that also need to be highlighted:

- The hand out given was difficult to understand (The Shipping Supervisor).
- No time to practice on the information system application after the training session (Service Co-ordinator 1).
- Extra work required (The Service Co-ordinator).
- A lot to take in from just one training session (Quality Managers PA).

The above points were made by only using ten randomly selected participants. Using a quantitative means, an additional perspective was taken from the questionnaire. Out of the 63 respondents (N=63), 47 individuals 'Agreed' with a further 7 'Strongly Agreeing' that the ISA could help them control the content of their job. These impressions imply that the technology is perceived as valuable. Whilst not specifically asking if the training session was suitable, the overall positive reactions to all the questionnaire questions could imply that other individuals did not have any major problems with how the training plan was constructed and delivered, as no comments were attributed in the open space provided on the questionnaire.



**Learning Point:** The majority of opinions presented from the trainees depicts that the overall training plan was considered successful. The issues may support the previous learning point and in relation to the learning theories reviewed. With a large number of employees to train, it was important to try and maximise the learning opportunities of all the trainees, which through in depth discussion, with just ten trainees, seems to have been achieved. To improve training programmes in future, the learning theories adopted could be further used to take account of the many different learning styles that individuals have, and a training programme constructed accordingly.

The above points and examples have been drawn from the participants who use the ISA, but the project team who put the training together also learned from a number of issues that could help with future projects. These issues are an important part of the learning that has been generated. A network was constructed in ATLAS.ti to examine the trainers' reflections. This network can be seen in Figure 8.3.

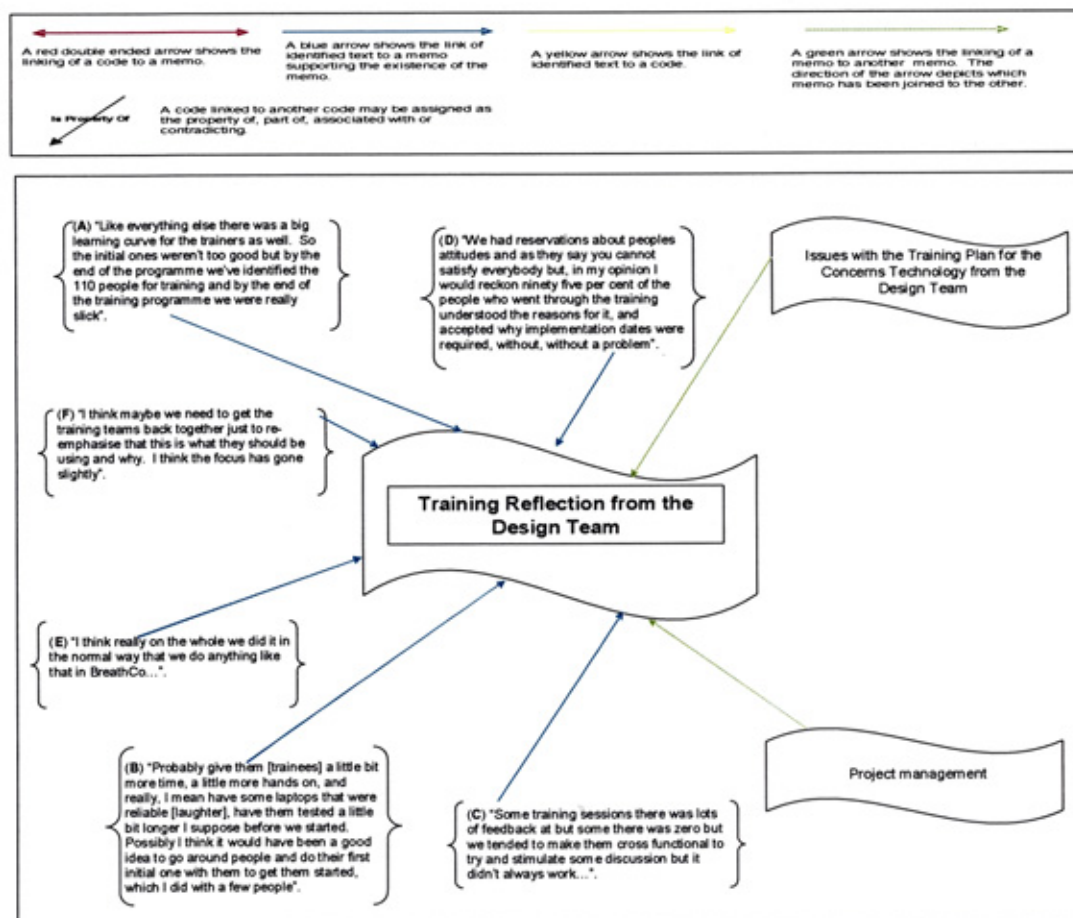


Figure 8.3  
Reflections from the Trainers



Figure 8.3 shows what the project leaders who were also the trainers would have done differently having reflected on the training. These issues can be seen through links 'A', 'B', 'D' and 'E' (the Quality manager (link 'A' December 2004); the 2<sup>nd</sup> customer services team leader (links 'B' and 'E' January 2005); and the product performance manager (link 'D' January 2005)). The Quality manager reflected on the training sessions and commented on the amount of participation from trainees and the feedback received as shown by link 'C' (December 2004). This comment seems to indicate the Quality manager believes mixing the trainees up would allow for greater discussion and questioning, which may allow a form of the zone of proximal development (cf. Vygotsky, 1978) to come into effect, which has been emphasised as being important.

In conclusion, the trainers all agreed that the ISA should have been further tested before undertaking the training. Whilst the training was good, the customer services manager offers the opinion that more people need to be brought back together to refocus the main outcomes of the project, as shown by link 'F' of Figure 8.3 (January 2005). As the customer services manager has pointed out however, the ISA has been in use for a number of months and not all employees are using it. What needs to be asked is how the project leaders can help employees find value in the technology. This could be linked to another aspect of management, which can relate to implementing, as well as continuously maintaining the ISA further. In association with these two issues, how participants use the ISA could have an impact on both use and maintenance. How these issues are undertaken needs to be explored.

### **8.3 Further Implementation, Maintenance and Use Issues Associated with Information System Applications**

The previous section reviewed how participation could be maintained once a project team have to move from the softer aspects that need to be considered, to the more structured requirements, and contact with technological specialists that an ISD project brings. It was also discussed how this process could further enhance the learning activities that have been created. On implementing the concerns technology, attention was also paid to how the training of other individuals would be undertaken. The learning theories adopted for this research were used to examine this process and discuss the successfulness of the approaches that the project team used. Finally, the

learning that this aspect of the project created was also considered. The future of the ISA, once all individuals were trained and the ISA was being used, needs to be examined. These issues will be dealt with in the next section on managing the customer concerns technology.

Before investigating these issues, firstly, it would be useful to find out how BreathCo's EDP (computer) department was involved in the project. An interview was set up with BreathCo's EDP manager (see section H.4 of Appendix H). This thinking came from the realisation that this was an IS project, and the EDP department seemed to only be involved on the sidelines, as a support department, and did not become more involved in the project. Is this a trait therefore of client led design (see Stowell and West, 1994) as an alternative to ISD projects, that have been handed to individuals of an organisations computer department which have the sole responsibility of design, and implementation? Secondly, the ISA will need to be managed; so if EDP was not fully involved, could they now support the technology, in a manner that will allow the ISA potential to be reached by the identified employees and the project team, who received the training?

### 8.3.1 Supporting the Customer Concerns Technology

A question was posed to the project leaders asking how EDP was involved with the concerns technology overall. The Quality manager acknowledges, *"well now they actually manage, support the system now that it's been handed over from an internal perspective. Although the team is still in direct constant contact with the developer in defining the system"* (December 2004). The Quality manager seems to be aware that EDP is managing the main database, or the hard aspect of the ISA, whilst the project team are still involved with the 'softer' aspects of how the ISA should perform. The product performance manager on the other hand has had several issues with the EDP department, more specifically with this project; his main point came from the training phase of the project, and the problems the team encountered with the laptops. The product performance manager goes on to further highlight issues he regards EDP should take responsibility for. One such issue relates to a security aspect with external staff, as well as expecting EDP to state BreathCo's IS security policies, which are not explicit.

The aforementioned issues further support the argument that a process of IS management could be used as the final piece of an ISD project, that a project team need to address. As the team designed the ISA for use in their jobs, this task may not have been able to be handled by the team and needed to be delegated to another department. How EDP considers this task should be handled, ought to be investigated specifically in relation to the concerns technology. The EDP manager declares that, *“from a user administration perspective it’s the Quality manager, from a technical, from a software technical perspective its \*\*\*\* [employee of EDP], and of course you’ve got these guys in the background who developed it in the first place, who are Info-Tec”* (December 2004). This thinking shows that there are three parties involved in maintaining the ISA, including the project leaders involved in the design and implementation, EDP as support at the BreathCo site, and the IS specialist who actually developed the technology.

At some point, this decision has been taken to support the ISA in this way but how was it taken? The EDP manager comments,

*“we don’t want to be in a position where we’re vulnerable, where we’re having to rely on third parties; we always want to have someone on site who has got that level of experience. There’s two reasons for that, first of all its common sense factor comes in, if somebody’s got a problem then they can come to us and ring \*\*\*, the standard help desk; and secondly, its financial as well that we don’t want to have to pay somebody to answer the most simple questions, although we do have a support contract with Info-Tec”* (December 2004).

The customer services manager agrees with the EDP manager when he refers to how EDP is involved with the ISA. The customer services manager believes EDP help with problems that the technology may provide, even though he previously has had no reason to contact them. Whilst the other project leaders looked at what EDP is supposed to do, the 2<sup>nd</sup> customer services team leader speaks specifically on what EDP should be doing to support the ISA,

*“they update information I would imagine on a weekly basis with the input of customer accounts and any revised accounts that need to be sorted; they actually give*

*everybody the tile to use on Lotus notes, and obviously if there's any problems with using the tile, we need to inform EDP to do that. But overall, I mean, there are people who have got authority to go in and change it, like myself and other members of the team, we can do changes within the code and things like that"* (January 2005).

This statement implies that individuals within the EDP department support the ISA, but improvements will come from the design team themselves, whilst as discussed by the EDP manager, a support contract has been taken out with Info-Tec if further, higher level problems occur.

**Learning Point:** *When an ISA is fully implemented, it is important that procedures are put into place to protect the running of the technology, so the advantages envisioned at the design stage can be reached. In order to do this, individuals of an organisation must possess the necessary skills otherwise; they have to be sought from outside the organisation. This however, could be expensive and need to be planned. Individuals who have responsibility for ISA within an organisation should be involved in some capacity, even if it is only providing advice.*

To try to understand why EDP was not fully involved in a project that, ultimately, they now have to support within BreathCo, a question relating to implementing ISA was posed. The EDP manager answered that the GREAT procedure is used. Individuals have ideas and other people come together to work on them, so the outcome can benefit all individuals of the organisation. The EDP manager continued by stating, in relation specifically to IS projects; firstly, a project team is formed where objectives can then be set, which allows the project to be scoped leading the specification to be generated, where hardware and software are implemented around the project. This process can be compared in a general way to how the CCM project was undertaken. The EDP manager however, seems to imply that this scoping and selecting hardware is a straightforward process as other hard methodologies discussed in Chapter Two imply. The EDP manager emphasises this thinking when he refers to GREAT and how it was used on the CCM project as the format a project should follow. He states, *"a storyboard was written, and then it was marshalled through. Now that's ideal and that's the way it should be done. It isn't always done that way I*

*have to say, but that's what we strive to try and make it happen that way"* (Interview with the EDP Manager, December 2004).

The process the EDP manager describes can lend itself to support what Stowell and West (1994) describe as client led design, where the people who require the ISA lead the design and implementation. As has been discussed, and will be highlighted again, the GREAT process gives the project team tools to help chart the progress of the project, but cannot tell a team how to conduct a project. The analysis from the EDP manager on how an ISD project should be conducted, demonstrates SSM<sup>XL</sup> can be used to provide a process for undertaking a project, whilst the GREAT tools can chart the progress of the project. It was unknown how other ISD projects were conducted within BreathCo, but the EDP manager also regards GREAT as a project framework. Therefore, how successful GREAT is in specifically helping with IS projects has to be considered. The EDP manager appreciates the GREAT process is useful, as commonsense has to be applied, so red tape is removed and project work can take place, due to BreathCo operating in two modes. These modes are,

*"either dead slow or it's urgent and it should have been done yesterday, there's no in-between. It's usually the latter of the two. So I don't have any regrets about not applying all these methodologies. The simple fact is we've got enough know how and experience now amongst the people that get involved, that the job will get done. ...So if you're going to ask what methodologies do you use, that's the one we use [GREAT]"* (Interview with the EDP Manager, December 2004).

This thinking further strengthens the previous learning point in making sure that necessary skills are available. However, if individuals within another organisation do not have the skills necessary, SSM<sup>XL</sup> may identify what skills would be required in all stages of the project. This may be why BreathCo may not have had a problem in conducting the project in that respect. The EDP manager believes methodologies would not add value to individuals of this organisation; however, SSM<sup>XL</sup> is not a process to follow step by step, but adds value through the thinking and techniques that are incorporated within it; which is why the project team may have found value in the techniques that were adopted (the AIM Venn diagrams and the rich pictures). This needs to be investigated in other organisations.

The analysis drawn emphasises that EDP support ISA which other individuals require, more than driving any technology developments, which they may undertake. This may be why projects are implemented more by teams rather than a dedicated computer department, undertaking all IS projects that users' request.

***Learning Point:** Any ISA implemented through a participative approach, has to make sure that the cost of the implementation can be met, as well as individuals of the organisation being able to provide provisional support; otherwise a partner organisation may need to be sought. These technologies may not have to relate to the organisations IS strategy as such, as they have been implemented to solve problems that users have identified in their jobs, which is associated to the business they are in. The ISA has to be managed by the individuals who helped design and implement it, if an organisation's computer department cannot or will not.*

The issues just revealed above and reinforced through the learning point, further emphasises that in this case, the EDP department are mainly responsible for what can be described as maintaining the technology more than formally managing it. If this is the same in other organisations, it may be left to the project team to manage the ISA from a user perspective. Even if a technology department is responsible for this task, it is still important. The problem may be that these issues are undertaken only on an ad-hoc basis. These issues, therefore, need to be taken into account. This is the focus of the next section.

#### 8.4 Information System Management Issues

If the customer concerns technology is to be managed successfully, the current approaches individuals of BreathCo have in place need to be identified. When interviewing the EDP manager, he refers to BreathCo's data management policies. Whilst no formal technology management strategy is available for ISA in themselves, BreathCo has a strong strategy to protect and manage data, which will include the concerns technology. The EDP manager explains,

*“we have central servers which are through there. We encourage people not to store data locally although we cannot prevent that. Every night we run a back up, so the*

*data's backed up, the entire database is backed up every night and we can go back two weeks from the devices we have here"* (December 2004).

This strategy can provide the data management aspect for what is to be recorded on to the ISA. As this strategy is in place, it can be argued that all the team have to do is now find a process for managing the advantages that the ISA will bring. As has been demonstrated, the GREAT process would not be suitable for this aspect of the project. A process therefore may need to be identified.

As has been emphasised and reviewed, the techniques and processes involved in design, training, and implementation were considered to be quite successful. A further form of management however, needs to be introduced that can take forward the learning achieved through using SSM<sup>XL</sup>, and help the project leaders focus on the advantages the ISA can bring to users, whilst helping non-users to find value.

The part EDP had to play in the project was to discuss the actual contract that would be given to the IS developer, and arrange how the ISA would be transferred to BreathCo, so that it can be supported and maintained. The role and procedures available to EDP in helping identify and select the IS developer related to a proven record of accomplishment. *"Basically, the vendor that we chose had already been involved with BreathCo for sometime and already demonstrated the quality of the goods that they would supply"* (Interview for the EDP Manager, December 2004). Along with these points, the EDP manager considers cost as an important issue, along with quality. The responsiveness of Info-Tec was also considered as an important factor, so questions and issues can be addressed in a timely manner, without additional expense to the technology. The amount of money a project requires can be quite a high priority for the EDP manager. The EDP manager regards cost is an issue, *"yes, because if you're going to do something, it has to have a benefit and the benefit, may not be a financial benefit although it nearly always comes down to finance in the end..."* (December 2004). This implies that 'cost' is not just limited to monetary values. A presentation is usually undertaken to show the benefits a project will bring, which usually relate to either a financial benefit or an efficiency benefit. The EDP manager continued by stating, *"it goes back to what we try and do is be specific as to*

*what the project is and measurable, you know, measure the success or the failure of it. It has to be that way” (December 2004).*

Having heard the EDP manager’s perspective that a failed ISD project can be measured, an inquiry was made into if such projects can be useful if further learning can be achieved from them. The EDP manager affirmed that all projects have a storyboard filled out for them (part of GREAT) where these lessons can be recorded. It is unknown how often these storyboards are reviewed with the problems identified throughout this analysis, relating to problems employees experience within BreathCo being recorded, and if learning is being achieved by other individuals through the implementation of ISA projects.

**Learning Point:** *If a project is to be undertaken using SSM<sup>XL</sup> or other participative approaches, procedures have to be put in place to help manage the process, once the ISA has been implemented. If procedures are in place, an organisations’ computer department could undertake this task on behalf of the team. If there are no procedures they need to be developed. Whilst the cost of implementation can be seen as an issue, it is important that if an IS developer is selected, they can provide the appropriate support in terms of flexibility by answering questions that are raised. As the team are not IS specialists, they may require more attention than a project involving pure technology specialists, or individuals within an organisations formal computer department.*

#### 8.4.1 Managing the Customer Concerns Technology

The previous section found that whilst BreathCo’s EDP department was believed to manage the customer concerns technology, it was identified that managerial responsibility rested with the project team. Within the management process, various other aspects can be related to the function. These functions can relate to monitoring concerns, reviewing what types of concerns are being logged, and how to check that concerns are followed up. These issues are presented in Table 8.1.



Team Member	Who do you feel should be responsible for monitoring the technology, and why do you think this?	What types of concerns are being logged onto the Technology?	Are concerns followed up to see if they have been satisfied?
The Quality Manager	<p>“Well management, organisation management of the system make sure that things are put in as specified, that there's no duplication, monitoring should be everyone who uses the system. Anyone should say right, I want to look at concern number; it should be up to each and everyone in the company” (December 2004).</p> <p>“I don't know whether it's a who or a, who to me is more specific to an individual, and I wouldn't say an individual should be responsible. But I think each department who have concerns raised in relation to defects or deficiencies highlighted from their department, should monitor it from their side” (January 2005).</p>	<p>“Mixture. Everything is now logged on the system” (December 2004).</p>	<p>“Not yet, I mean we, the system itself, as I explained to you earlier is structured so that the owner can only sign off for it. What we haven't done yet, what we've got updated where we have the analysis tools available yet to look at where concerns are being closed off, or do they re-emerge. So we haven't got enough information yet or more” (December 2004).</p>
The Product Performance Manager	<p>“I don't know whether it's a who or a, who to me is more specific to an individual, and I wouldn't say an individual should be responsible. But I think each department who have concerns raised in relation to defects or deficiencies highlighted from their department, should monitor it from their side” (January 2005).</p>	<p>“All sorts of concerns. That's what's good about it, you see everything, from small to big to consistently, more consistent defects and this is why, like the invoice is incorrect, I think that's one of the bigger ones” (January 2005).</p>	<p>“They are to be perfectly honest, they are. I don't get involved too much in that. I do know accounts have had PSPs. I've not seen the results or even read the PSPs myself, but I know some have been implemented” (January 2005).</p>
The Customer Services Manager	<p>“For that I'd say the team of four people who kicked it off. And through time we probably need to change that” (January 2005).</p>	<p>“Not as many as should be. And I mean I hold my hand up as well. One of the main problems you've got like in our department, in sales and marketing, the phones just constantly ringing. So you've got a guy on the phone, and it doesn't start off as a concern or a complaint. It's just through the conversation you're having with him you realise something's wrong here. And you've got your beep coming through on your phone telling you your next calls waiting. So the time you've finished that one it's actually remembering and taking the time to go back and log that information on to the system. So I think there's not as many complaints have been logged, as there should be; but on the question</p>	<p>“Generally yes, on the ones in my department, I'd say yes” (January 2005).</p>

Team Member	Who do you feel should be responsible for monitoring the technology, and why do you think this?	What types of concerns are being logged onto the Technology?	Are concerns followed up to see if they have been satisfied?
The 2 <sup>nd</sup> Customer Services Team Leader	<p>“Again you’re going back to the Quality Department, management, and senior management, and obviously at a glance, I mean, each person who is responsible for entering concerns. They could monitor themselves and see how they’re doing, you know. I don’t think they should be overall responsible for any analysis, analysing that needs to be done, but at least they can see the amount of returns they have in, or the amount of concerns that they’re having. So it’s a good way of monitoring for yourself really” (January 2005).</p>	<p>of big complaints or small ones, I think it’s a mixture of both” (January 2005).</p> <p>“There’s a mixture, big and small ones, I think the most important ones are the returns to the company that’s been addressed; using that as a database for returns actively give us somewhere, some way of monitoring instead of just collecting the data we had, now we can analyse that as well, but there’s a variety” (January 2005).</p>	<p>“Hopefully just by the person whose, who the ownership is, obviously if it’s been a formal complaint I would have thought they would go to the, at least their line manager, customer services manager and say, you know, I’ve had this unsatisfactory complaint, but we don’t get that many really nasty complaints” (January 2005).</p>

Table 8.1

Thoughts Exploring Early Technology Management Issues

Table 8.1 has been constructed to show the differing opinions the project leaders have over responsibility for monitoring the concerns ISA. Along with these differing opinions, two questions relating to following up concerns and the type of concerns that are being logged are displayed. With all these differing opinions, it further emphasises the requirement of a process that can help with the management of the concerns technology. A review of the analysis that was undertaken with a number of identified users and non-users of the concerns technology (see Appendix J, Tables J.1 and J.2), the gas detection supervisor, the customer services technical support employee, the purchasing employee, the shipping supervisor and the Quality employee, would not be following up their concerns (whether they received them or not). This is believed as these participants stated they do not know if concerns are followed up. This implies that they have no information on what procedures are in place to follow up concerns. The problem is that these conflicting opinions were only uncovered by this analysis. Only through conducting this research and feeding back the analysis to the project team were these and other issues, identified. These differences could be highlighted if a framework to help manage the ISA could be found, and used by the team.

Whilst consensus seems to have been reached on what concerns are and what should be logged (see Table 8.1), it should be highlighted yet again the problems individuals face when using the ISA. The customer services manager refers to logging, in relation to time issues participants may face. These issues can relate to 'fire fighting' and 'standard operating problems the individuals of the organisation faces', as previously discussed. The project was undertaken, along with other issues, to try to help with the time issues individuals constantly faced. The customer services manager declares these time issues may restrict the usefulness of the technology, as concerns are being missed which may identify problems, which if corrected, could allow individuals the time that they currently lose. To explore if time issues are a problem in using the ISA, the ten participants' (the users and non-users of the ISA) opinions can be drawn on here. Half of the participants appreciate the ISA was not time consuming. One individual did not know. Two individuals considered initially the ISA could be time consuming (the accountant and the research and development employee); while two participants did believe the technology was time consuming

(the service co-ordinator and the customer services technical support employee). It can be summarised therefore, that the ISA overall is not time consuming.

Going back to Table 8.1 and reviewing whom the project team consider should be responsible for monitoring the ISA, the Quality manager states each individual should be responsible for the basic inputting and checking of concerns, but does not consider the overall management of the technology to be one individual's responsibility. How this can be achieved needs to be investigated. To try to focus on the processes that have already been identified, and discussed through the memos constructed within ATLAS.ti, and the related codes coded within the interviews, Figure K.2 in Appendix K was used. As can be seen in Figure K.2, Appendix K, the network is complex. Whilst being quite complex, it has been designed to display the overall issues that have been identified and discussed throughout this case, and contributes' to the overall improvement individuals could perceive within the organisation. Figure K.2 of Appendix K, is not displayed as a sequence of events, for example, moving from left to right or from top to bottom, but shows what issues could have an impact on the individuals of BreathCo improving. The evidence of the memos and codes are derived from the quotations taken from the interviewed participants (see Appendix F). What Figure K.2 of Appendix K is trying to depict, relates to how current processes within BreathCo may restrict improvements, even though the concerns technology has been designed to help. For example, at the bottom of Figure K.2 (see Appendix K) 'BreathCo operations too slow' is considered to apply to how aware individuals are of this process, which the concerns technology can highlight. This may allow a 'systems' perspective to be undertaken on these organisational problems and allow individuals to try and solve them. If individuals are not aware of these problems, by not using the ISA, this can relate to what has been coded 'negative individual awareness'; which was also related to not seeing what the project meant to achieve in the first instance. If individuals remain unaware, they could contribute to the ineffectiveness of the organisation.

The ineffectiveness of BreathCo may also come through not wanting to tackle the problem that the project has been instigated to solve (concerns), or through the output, the ISA creates. This point can then relate to fire fighting, which may or may not allow learning from experiences to take place. If learning is taking place, it can help

improve the overall organisation. If individuals are aware of processes and problems the organisation faces, they may contribute to the effectiveness of the overall organisation, which the concerns technology could help with. Undertaking the project and the resultant ISA aims at satisfying customers. If customers are being satisfied, individuals could be contributing to the effectiveness of the organisation. If individuals of the organisation are improving, they may become more effective and in turn become more consistent, which is regarded to be part of an organisations awareness that can also be associated with improvement.

**Learning Point:** *It is important that once an ISA has been implemented and is in use, an explicit approach to managing it should be developed. By developing such an approach, issues can be addressed more formally such as monitoring and following up on particular problems, as well as identifying any problems users may be experiencing with the technology.*

Staying on the theme of IS management, and specifically in relation to the CCM project, the support of the EDP department is important, as it allows expertise within the organisation to be available. This issue is argued to be associated with organisational effectiveness. If these skills had to be contracted out with no other individuals within an organisation understanding how this process is undertaken, it would relate to an ineffective organisation. A less effective organisation may also come from departments not co-operating with each other. The concerns technology was designed to help with this factor by highlighting problems that can then be addressed in a more constructive manner. Throughout Figure K.2 of Appendix K, two issues can be seen as taking place. Firstly, the issues may relate to the design and implementation of the ISA that SSM<sup>XL</sup> was used to address. The second issue relates to the same issues identified through using the ISA. If the ISA is not managed in a suitable fashion, or not used in the way the technology was designed for, then the technology cannot contribute to making the individuals of the organisation more effective. Only by learning about the complete process can advantages aimed to be achieved be received. In order to discuss this process, a less complex network can be used. This network is displayed as Figure 8.4.

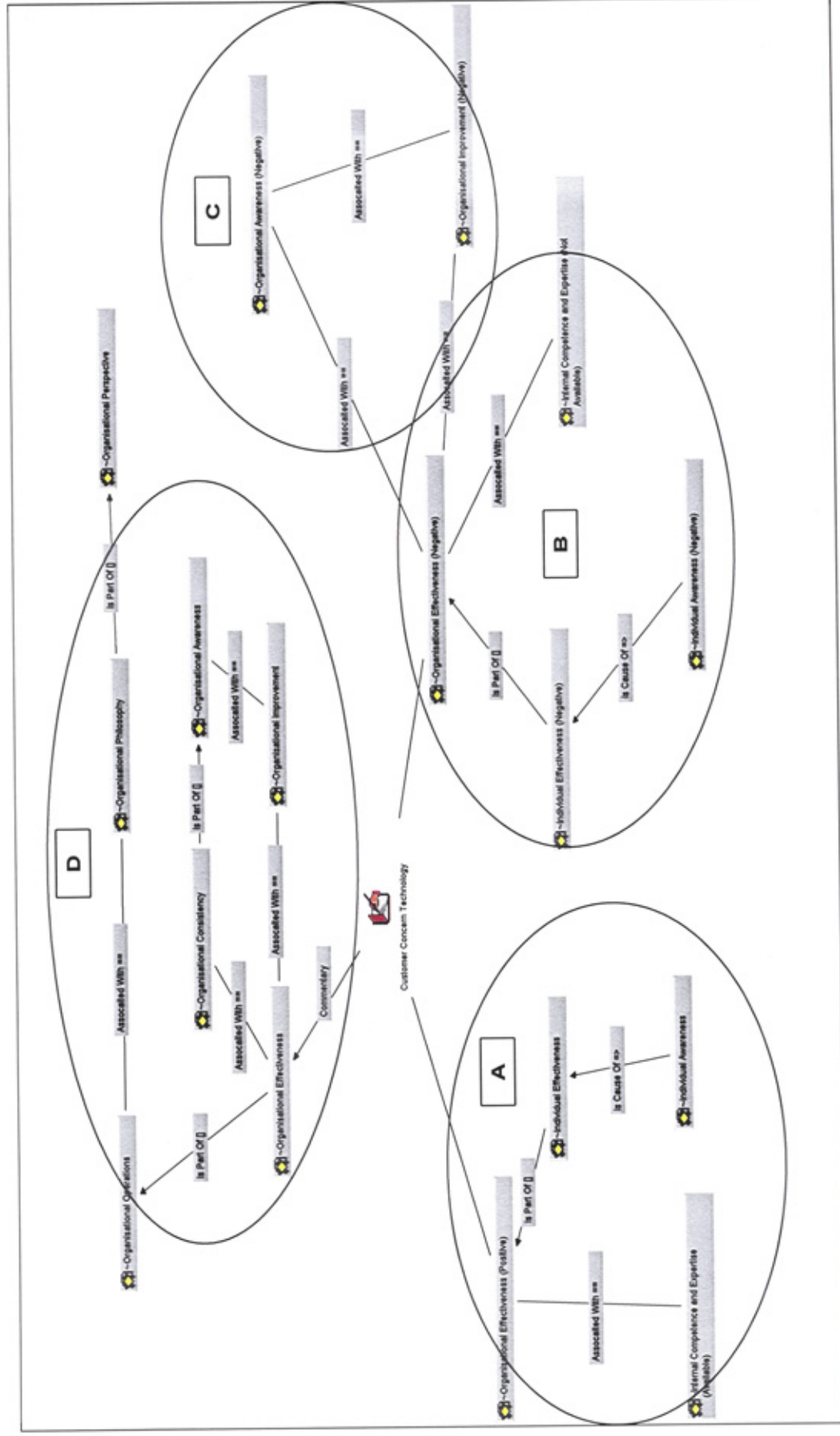


Figure 8.4  
The Condensed and Structured Organisational Improvement Framework

Figure 8.4 is a network, that was constructed in ATLAS.ti and is reproduced as such here (as opposed to using a Power Point slide). The network shows what has been examined throughout this case and the possible paths the project could take up to implementation, and where the outcomes of the project may go after implementation. The figure is constructed from the bottom up and can be divided into four sections (A – D) for discussion purposes.

Figure 8.4 shows the ideas and thinking that have been drawn out through the primary research of this PhD project. It demonstrates how the occurrences of following certain paths can relate to IS design and implementation, the learning the process can produce, and the effectiveness that it can provide for individuals within an organisation. Starting within circle 'A' of Figure 8.4, it is important that the process of designing and implementing an ISA provides an environment where learning can occur. This is argued to be produced through SSM<sup>XL</sup>. The SSM<sup>XL</sup> framework can raise individuals' awareness upon the requirements of firstly, the problem, secondly the technology, and finally other organisational issues and processes that could be contributing to the problem. Along with this individual awareness, individuals within an organisation that have expertise in undertaking the project or implementing the required ISA will create greater organisational effectiveness. The contribution of individuals who were aware of issues and problems, as well as having the appropriate expertise (even though this came from hiring the IS developer from Info-Tec), allowed the implementation of the customer concerns technology.

If expertise and individuals' are not aware of issues that relate to the problem, the overall effectiveness of an organisation may suffer, as shown through circle 'B' of Figure 8.4. Even though this path shows individuals being unaware of issues, which could contribute to individuals being ineffective, an ISA still could be implemented. If the technology is implemented through this second path (circle 'B'), key issues that SSM<sup>XL</sup> tries to highlight may have been missed, and result in an ISA that does not help with the envisioned problem. The ISA therefore may need to be re-designed and changed. If these issues are not identified, the individuals could cycle through circle 'C' of Figure 8.4. This can be thought as the ineffectiveness of the designed and implemented technology, which would not allow the individuals who make up the

organisation to become aware of problems and issues, which would prevent improvements occurring.

If through using SSM<sup>XL</sup>, or through using the designed and implemented ISA, problems and issues are identified, it may allow individuals of an organisation to become more effective. It is argued that the two issues are related, as the learning is built on by using SSM<sup>XL</sup> once an ISA is implemented. In being able to do this, a move to the top of Figure 8.4 and circle 'D' can be undertaken. The top part of Figure 8.4 (circle 'D') implies that an organisation that can become more consistent, aware, and improve, will make a more effective organisation. An effective organisation is thought to help individuals of that particular organisation undertake the regular operations of the organisation, which is associated with the philosophy and perspective that the particular organisation embodies. The more effective the individuals are that make up the organisation, the more effective an organisation can become in undertaking regular operations. As has been argued, technology can help with this task but how an ISA, or in this case the concerns technology is designed and implemented becomes very important.

Figure 8.4 does not imply that if individuals of an organisation start over at circle 'A' and use SSM<sup>XL</sup>, that implementing an ISA will enable an organisation to become automatically more effective. It is up to the individuals of the organisation to investigate the problem and design and use the ISA in the most suitable way that they can. If this does not happen, the individuals may contribute to an organisation becoming less effective and moving to circle 'B' and circle 'C' of Figure 8.4.

The thinking just outlined above is argued to relate to how individuals of BreathCo can use the concerns technology to become more effective. This issue is related to the overall management of the technology. Issues included in managing the technology, can relate to the future plans that individuals have for the ISA, for example. The future issues facing the project team can be seen in Figure 8.5 below.



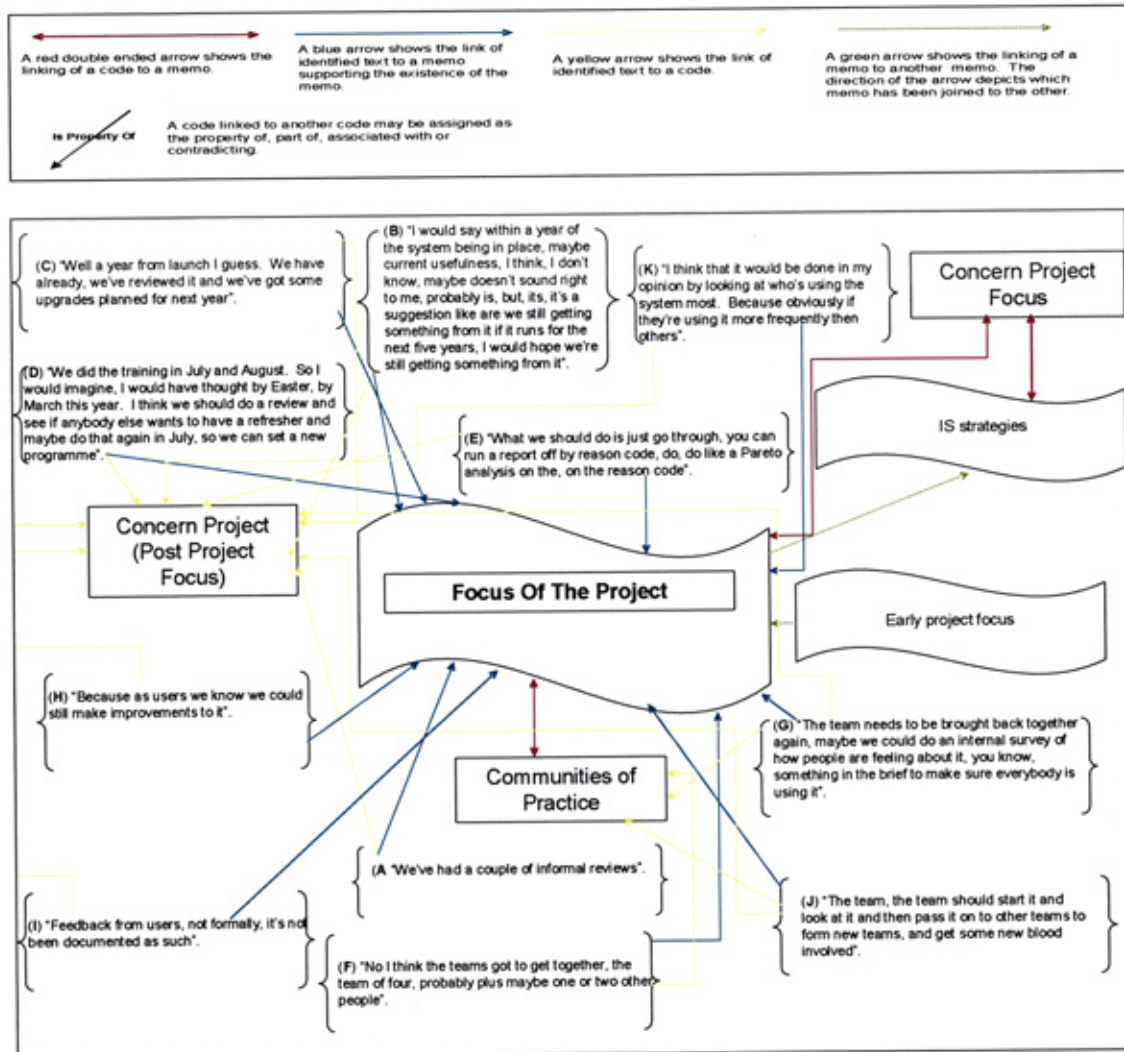


Figure 8.5

*Exploring the Future Management of the Concerns Technology*

Figure 8.5 displays a wide variety of perspectives on what future management plans should consider with the ISA now that it has been implemented. Identifying when a review on the usefulness of the technology should be undertaken, links A to D can be used (the customer services manager (link 'A' January 2005); the product performance manager (link 'B' January 2005); the Quality manager (link 'C' December 2004); and the 2<sup>nd</sup> customer services team leader (link 'D' January 2005)). This thinking shows that not only do issues relating to management have to be undertaken, but training issues are also still important.

Going back to the customer services manager and his opinions on the need to undertake a review, how a formal review will be conducted needs to be explored. The customer services manager takes account, that the reporting functions that the ISA

offers should be used to help with any review as shown by link 'E' of Figure 8.5 (January 2005). The customer services manager implies the review can relate to exploiting the ISA through looking at the output being produced, which will be used to improve the organisation. These improvements do not specifically consider the ISA, but the individuals of the organisation. The other project leaders do however see the project team and the individuals who use the ISA to be involved in any review, as shown through links 'F' (The Product Performance Manager, January 2005) and link 'G' (The 2<sup>nd</sup> Customer Services Team Leader, January 2005). These perspectives show a review should be undertaken but how and who should undertake this review is not clear.

The project team was asked on the topic of reviewing the ISA, who should undertake this process and how it should be conducted. All of the project team (the Quality manager, the product performance manager, the customer services manager, and the 2<sup>nd</sup> customer services team leader) accept they should be involved in some capacity. The Quality manager (links 'H' and 'I') believes that as the team know improvements can be made, they should be involved and so appropriate feedback can be obtained. The customer services manager believes the team should begin the process before passing it on to other individuals (link 'J') (January 2005).

As can be seen in Figure 8.5, the customer services manager's comments are linked to the code 'communities of practice', as other individuals may enter the community, that has been established and discussed within this analysis. This is argued to be an important aspect when implementing ISA, but could also relate to activities that are a result of the technology, that could increase further learning activities for individuals within an organisation. Focusing on the customer services manager's thinking, this review should be undertaken by allowing new blood to be brought in.

Just like the customer services manager, the product performance manager perceives the team to undertake the review along with a few other people, linking again to connecting to the community of practice code relating to concerns (link 'F' shown in Figure 7.5). If this community, as it has been described, is to continue, the product performance manager considers identifying who is using the ISA and obtaining their opinions (link 'K') (January 2005) as important. Finally, the 2<sup>nd</sup> customer services

team leader also considers the project team to undertake the review. The 2<sup>nd</sup> customer services team leader would like to conduct a survey so other individuals can put across their points, which have already been highlighted above (link 'G'), and she adds the project team should undertake this. As the involvement of other individuals is thought to be required, the quote was linked to the code 'communities of practice' along with the product performance manager and the customer services manager's thinking.

If the community that has been identified, is to be successful as has been explored above, other individuals should be able to contribute. Therefore, are individual's comments and suggestions, either formally or informally taken on board? The customer services manager responded to this point enthusiastically,

*"yeah, I mean there has been a couple of little tweaks made to the actual, the, the database itself, the fact that like putting the account number in, and the order numbers came up in one way, it would be better for them to come up in another way. So there have been a couple of minor modifications done on that. Other than that I don't think there's any plans at the moment to make any drastic modifications"* (January 2005).

On a similar train of thought, the 2<sup>nd</sup> customer services team leader states,

*"yes I've had a few, I've made notes and I've changed a few little categories of codes within it and we have had like bigger issues that I've had to involve the Quality manager and the product performance manager rather than just myself"* (January 2005).

These two extracts from the customer services side shows that the ISA is being updated for little issues as they arise, but for other bigger issues the team has to come together so everybody can get involved. It is strange that the Quality manager believes updates are being planned but the customer services manager conveys they are not. This demonstrates different thinking and a lack of communication perhaps that a framework could help address.

It is emphasised again that that whilst processes such as reviewing and updating or even exploiting the concerns technology takes place, more learning can be achieved if undertaken more formally. It is argued again that a framework that can help a project team should be used that can be linked with SSM<sup>XL</sup>.

***Learning Point:** Whenever an ISA has been implemented into an organisation, the technology must be managed in an appropriate way that allows the current and future needs of the users of an organisation to be met. An organisations dedicated computer department could undertake the management of the technology. If this option is not available, the team who initiated the project could be left with an ISA that loses its usefulness over a period of time, or goes through a number of different changes due to team members implementing ideas they assume will help. To make this process more effective, a framework that can be linked to SSM<sup>XL</sup> in a useful way should be used, which would be a natural progression for the project team and help handle these management processes.*

From the analysis of the data collected from BreathCo, it can be drawn out that whilst management processes are considered, these are being undertaken or discussed informally. It is argued that a second framework should be identified, that is commensurable with SSM<sup>XL</sup>, and therefore a framework can be developed that deals with soft and hard issues of ISA design and implementation, with a focus on learning activities. In order to address the issues associated with ISA implementation, training, further implementation, maintenance, and ISA management issues, the SSM<sup>XL</sup> framework will need to be further developed.

### **8.5 Summary of the Learning Points Drawn out from the Second Cycle of Action Research**

It is argued that by addressing the problems and the learning points identified from this chapter that SSM<sup>XL</sup> can be further developed. However, issues of moving from using SSM<sup>XL</sup>, to conducting ISA implementation, training, further ISA implementation, maintenance and use issues, and finally ISA management issues, need to be addressed. The learning points are repeated again here within Table 8.2.

Issues	Learning Points
Approaches to ISA development	<p><b>1. Community kept alive:</b> It is important that the community is kept alive; as it can be easy for a project team to allow an IS specialist to develop what he believes would be the best form of ISA. The project team need to encourage regular meetings and dialogue so they can be involved in all stages of the project, even though they do not have the expertise to develop the technology themselves.</p> <p><b>2. ZPD useful in model conversions:</b> The zone of proximal development can be a useful approach to investigate the conversion of models and other illustrations into a language in conjunction with an IS specialist. This is argued as participants who have the knowledge on how to accomplish specific tasks and participants who do not yet possess such skills. Through the zone of proximal development, participants of BreathCo can help the IS specialist learn about issues required within the concerns technology. The IS specialist can then convert the plans for the development of the technology back to the participants. This process can allow the participants to remain involved in the design of the ISA, which forms a continued participative approach and learning cycle.</p>
Training	<p><b>3. Training is important when developing ICTs:</b> Training is an important aspect in implementing an ISA. As training is undertaken for the purpose of instructing how trainees are to use the technology, and get benefits for themselves as well as other members of the organisation; this stage should not be overlooked. The learning styles of individuals become very important, and therefore need to be taken into account. Hands on experience, is especially important with ISA, which is argued through using Bandura's (1986) learning theory as being able to enhance the process. Exploring personal, behavioural, and cognitive factors, as well as environmental factors, could enable trainers to identify any limitations a training plan contains and correct this allowing a more suitable learning environment to emerge. The training programme could be used to help enter the zone of proximal development with the individuals who have the knowledge about how the technology works, and should be used as they helped design it. The participants involved in implementing the technology, should be involved in helping develop a training programme.</p> <p><b>4. Maximise learning opportunities:</b> The majority of opinions presented from the trainees depicts that the overall training plan was considered successful. The issues may support the previous learning point and in relation to the learning theories reviewed. With a large number of employees to train, it was important to try and maximise the learning opportunities of all the trainees, which through in depth discussion, with just ten trainees, seems to have been achieved. To improve training programmes in future, the learning theories adopted could be further used to take account of the many different learning styles that individuals have, and a training programme constructed accordingly.</p>
Further implementation, maintenance and use issues associated with ISA	<p><b>5. Processes to protect ICTs:</b> When an ISA is fully implemented, it is important that procedures are put into place to protect the running of the technology, so the advantages envisioned at the design stage can be reached. In order to do this, individuals of an organisation must possess the necessary skills otherwise; they have to be sought from outside the organisation. This however, could be expensive and need to be planned. Individuals who have responsibility for ISA within an organisation should be involved in some capacity, even if it is only providing advice.</p> <p><b>6. Organisations has to provide support:</b> Any ISA implemented through a participative approach, has to make sure that the cost of the implementation can be met, as well as individuals of the organisation being able to provide provisional support; otherwise a partner organisation may need to be sought. These technologies may not have to relate to the organisations IS strategy as such, as they have been implemented to solve problems that users have identified in their jobs, which is associated to the business they are in. The ISA has to be managed by the individuals who helped design and implement it, if an organisation's computer department cannot or will not.</p>

Issues	Learning Points
Management issues	<p><b>7. Identifying appropriate management processes:</b> If a project is to be undertaken using SSM<sup>XL</sup> or other participative approaches, procedures have to be put in place to help manage the process, once the ISA has been implemented. If procedures are in place, an organisations' computer department could undertake this task on behalf of the team. If there are no procedures they need to be developed. Whilst the cost of implementation can be seen as an issue, it is important that if an IS developer is selected, they can provide the appropriate support in terms of flexibility by answering questions that are raised. As the team are not IS specialists, they may require more attention than a project involving pure technology specialists, or individuals within an organisations formal computer department.</p>
	<p><b>8. Make approach to managing ISA explicit:</b> It is important that once an ISA has been implemented and is in use, an explicit approach to managing it should be developed. By developing such an approach, issues can be addressed more formally such as monitoring and following up on particular problems, as well as identifying any problems users may be experiencing with the technology.</p>
	<p><b>9. Manage ISA appropriately:</b> Whenever an ISA has been implemented into an organisation, the technology must be managed in an appropriate way that allows the current, and future needs of the users of an organisation to be met. An organisations dedicated computer department could undertake the management of the technology. If this option is not available, the team who initiated the project could be left with an ISA that loses its usefulness over a period of time, or goes through a number of different changes due to team members implementing ideas they assume will help. To make this process more effective, a framework that can be linked to SSM<sup>XL</sup> in a useful way should be used, which would be a natural progression for the project team and help handle these management processes.</p>

Table 8.2

*Identifying the Issues that a Second Commensurable Framework Needs to Address for ISA Implementation and Management Processes*

Table 8.2 highlights the gap at the completion of SSM<sup>XL</sup> and the issues that this research has identified. The bold statements that precede each learning point are used as a code to aid readers in remembering what each learning point states, as they will be referred to again. The learning points that are drawn out and highlighted provide a project team with a number of processes that need to be considered for the CCM project, but may also apply to other ISA projects. It is argued that these points can be considered through a formal framework that allows a project team to navigate the gap between the softer issues of ISA projects (the SSM<sup>XL</sup> framework), and the more structured aspects (implementation). It was at this point in the research that attention turned back to the IS literature. Much work has focused on IS integration and IS strategy (e.g., Henderson and Venkatraman, 1994). Such frameworks however specify a way for individuals within an organisation to best align its business, infrastructure, IT strategy and IT infrastructure processes. This literature, whilst useful at a senior management level, would not provide sufficient value to a project team, or help with the change of philosophy from the soft tacit issues to the hard more structured aspects of ISD. The main literature reviewed, has been discussed in Chapter Four, section 4.2 onwards. As a recap, the research area of technology management was highlighted as one approach that can help a project team manage the concerns technology through the learning points Table 8.2 has identified. By exploring the area of technology management with particular attention to the management of technology process, the management of technology process led to the identification of the technology management process framework (TMPF). Even though this framework was identified within the literature, further data from the customer concerns project was explored to check the suitability of such an approach.

### **8.6 Identifying Aspects of the Technology Management Process Framework within the Customer Concerns Management Project**

This part of the research focuses on technology management, or in particular, the five processes of Identification, Selection, Acquisition, Exploitation, and Protection (ISAEP) as a framework. The purpose of this is to see if the five processes can help a project team undertake the management of the concerns project to further generate learning activities. Along with this issue, an attempt to focus on the softer issues is also explored. As a further recap, the adapted TMPF that has been identified for this study is shown again here as Figure 8.6.

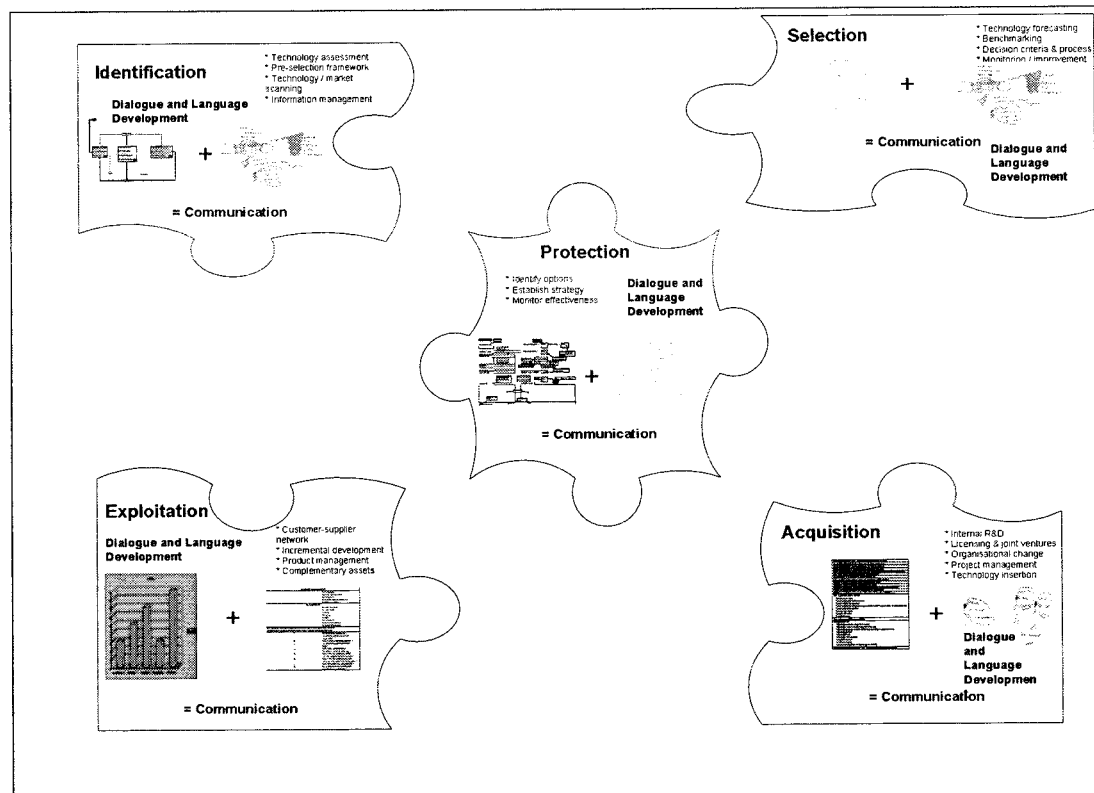


Figure 8.6

The Adapted Technology Management Process Framework Used to Identify Issues of Identification, Selection, Acquisition, Exploitation, and Protection

Figure 8.6 was first shown in Chapter Four as Figure 4.6 to emphasise the different formats that could be used within each phase of the technology management process framework. While the framework was identified and adapted, it was only at this stage of the research that the data collected could be used to investigate the suitability of the TMPF.

### 8.6.1 Current Information Systems Identification and Selection Strategies within BreathCo

A network was constructed in ATLAS.ti to specifically chart how ISA were identified and selected within BreathCo. This memo draws on the data that was used to investigate how the concerns technology was supported. To stop repetition the memo will not be shown here. The main issues the memo draws out included:

- The GREAT process is a tool individuals of BreathCo use as an information systems development (ISD) methodology (The EDP Manager and The 2<sup>nd</sup> Customer Services Team Leader).



- The information systems development process is very ad-hoc (The Customer Services Manager).
- The benefits of an ISA need to be specified and presented to senior managers (The EDP manager).

The memo that was used to explore identification processes was also used to give an overview of current ISD within BreathCo, to try and link to the five processes to see if they were relevant. The best example in order to start looking at these processes, comes from the EDP manager. The processes (ISAEP) are placed in brackets within the quote in an attempt to support this thinking. The EDP manager states, “*so it’s a typical scenario where a project team is formed, objectives are discussed (identification), the project is scoped, specification is generated (selection) and then the software, hardware processes are then developed (acquisition) around the project*” (Interview with the EDP Manager, December 2004).

To further investigate these initial identification and selection processes, a network was constructed to see the current technology mix within BreathCo and how this was undertaken. Technology mix in this sense means the different ISA that individuals’ within an organisation use. This network can be seen in Figure 8.7.

Figure 8.7 demonstrates BreathCo’s ISA mix as discussed by the EDP manager within his interview through links A to E (December 2004). The data demonstrates a number of issues that the EDP manager has to consider with reference to time, newer technologies, and how these are ‘identified’ (e.g., home working and the requirement for data cards and Internet access through mobile phones). Whilst the EDP manager has to contend with a number of identification and selection processes for BreathCo, he also has to communicate with the appropriate individuals. The CCM project team is one set of individuals. It can be argued that identification and selection processes need to be undertaken within BreathCo and can relate to different projects at different times. The ISA that BreathCo use are on the whole ‘selected’ from ‘off the shelf’ (link ‘D’) which requires identifying what is going on in the world of technology (link ‘E’). From this data, it is concluded that identifying and selecting approaches for ISA is important.

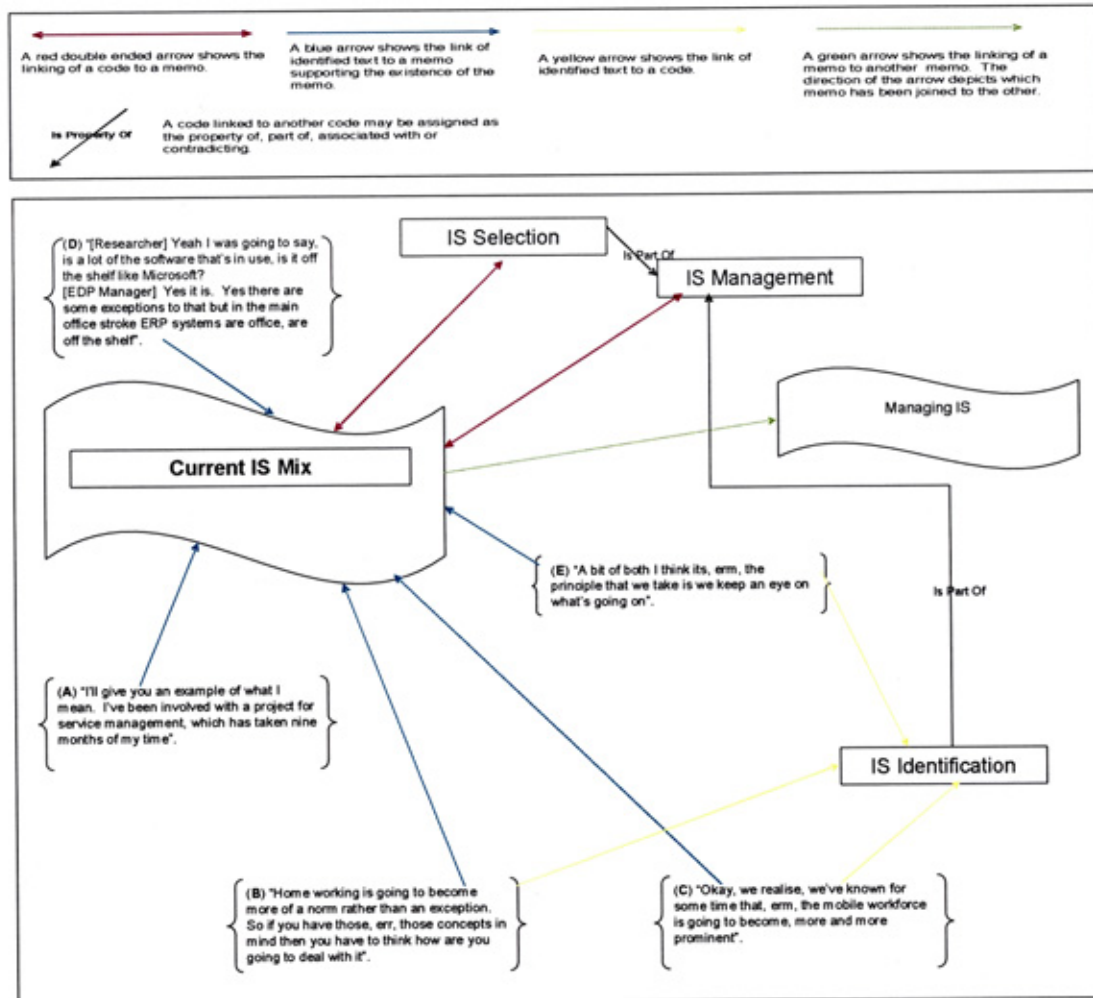


Figure 8.7  
*BreathCo's Information Systems Mix*

Further networks were constructed and placed into Appendix K (Figures K.3 to K.5) to explore issues with selection, acquisition, exploitation, and protection. The networks will only be summarised here due to the preference to draw out the data using a large table that re-produces the same quotes (Table 8.3). Focusing on the issue of acquisition of an ISA (see Figure K.3, Appendix K) links were found with the issues of ISA identification and selection. This is why they are included in this section before focusing on acquisition, exploitation, and finally protection. These issues included:

- The identification of SAP as one technology solution during the first part of the project as well as the possibility of hiring Info-Tec (The Quality Manager). A meeting was therefore arranged to discuss the CCM project, which led into the selection process.

- Selection issues can be associated with cost (The Quality Manager and The EDP Manager).

The Quality manager contemplated cost as not being an issue, referring to selecting the SAP technology, if that was thought to provide the best solution. These conflicting bullet points may imply that cost may be an issue when actually acquiring the ISA, but any ISA could be identified and selected. These differences need to be communicated, which is why building on SSM<sup>XL</sup> is being argued for. These issues may further emphasise that the soft issues which can be related to identification and selection need to be explored to allow teams to further debate the best technology and not rely on quantitative or other unhelpful processes.

#### 8.6.2 Acquisition, Exploitation, and Protection Processes

The previous section has drawn out basic identification and selection processes that have to be performed within BreathCo. In this section, specific focus is placed on trying to pinpoint any acquisition, exploitation, and protection processes that can take place. These issues can also be seen through Figure K.3, Appendix K. Upon exploring the acquisition of the concerns technology, it was recorded that it took a prototyping approach. Therefore, 'IS Prototyping' is one method that a project team can use to acquire an ISA and has been linked to 'IS Acquisition' (see Figure K.3, Appendix K). The technology was initially designed by Info-Tec and given to the project team to test and make suggestions to the IS developer. Eight quotations were identified, demonstrating this acquisition and prototyping approach. The quotes include:

- Testing the ISA, undertaking pilots and feeding back the results to the IS developer (The Quality Manager).
- Using similar processes to how other ISA have been acquired (The EDP Manager).
- Gaining help from the IS developer directly (The 2<sup>nd</sup> Customer Services Team Leader).

The findings are similar to the research carried out by Kai-ming Au and Enderwick (2000) on attitudes towards technology adoption. The authors found that adoption

attitudes related to perceived benefits, value in the technology, compatibility of the technology to an organisation, perceived difficulty of the technology, commitment of the supplier to the technology, and previous experience of adapting technologies (Kai-ming Au and Enderwick, 2000). These and other issues may need to be considered within the acquisition stage of any ISA which may be missed if more structured methods are undertaken.

Once the concerns technology has been acquired and the employees trained, it was hoped that the ISA would then produce the envisioned benefits. These issues can relate to exploiting the concerns technology. A number of quotes were identified about exploiting the concerns technology through data collected during the follow up interviews. Two of these issues relate to:

- Moving from just capturing data to using the data to improve products and services (The Product Performance Manager)
- Holding current problems that can then be addressed (The Customer Services Technical Support Employee).

Whilst the network that was constructed (see Figure K.4, Appendix K) shows the positive aspects of exploiting the concerns technology, and what it is hoped to achieve, negative issues were also identified. These issues relate to what the product performance manager highlights as the continuing use of other databases recording the same data as the concerns technology. Other negative issues have been identified by the 2<sup>nd</sup> customer services team leader with reference to the laptops during the training programme and the perception this may have had on other individuals. These issues are important in relation to the concerns technology and need to be addressed. The issues that are related to the CCM project may be addressed through the GREAT process, but may be more focused through the use of the technology management process framework (TMPF) to chart the progress of each issue.

The final process that makes up the technology management process framework is the issue of protecting an ISA. Issues relating to protection have also been identified through a network (shown in K.5 Appendix K) and can be summarised here as:

- EDP are required to protect the CCM technology through updating the customer data so the correct data can be used (The 2<sup>nd</sup> Customer Services Team Leader).
- Specialist skills are located within EDP, who understand the technology (The Customer Services Manager and The Quality Manager).
- Constant contact with the IS specialist from Info-Tec (The Quality Manager).
- Taking out a support contract with Info-Tec in case issues arise that EDP cannot resolve (EDP Manager).

It is argued that all these issues need to be documented formally, so if any disagreements are raised about how best the issues can be undertaken they can then be discussed.

Whilst the above issues display positive aspects on protecting the customer concerns technology, there were also negative aspects identified that could have, or did in some cases (in relation to the training), display processes that are not protecting the technology. This leaves the exploitation aspect of the customer concerns technology open to erosion. These examples come from the project team in discussing the problems with the training which ranged from:

- Lack of support from EDP during the training sessions (The Product Performance Manager and The Quality Manager).
- Withdrawal of the concerns technology from external staff over data security issues (The Quality Manager).

If these issues can be formally identified, they can be addressed more effectively. This is the argument for using the technology management process framework.

With the technology management process framework, it is argued that all of these aspects (Identification, Selection, Acquisition, Exploitation, and Protection) can be undertaken in a more structured way, with enough flexibility to allow the soft issues of ISA implementation and management to be focused upon and further explored. In

reviewing the data, it was considered that the BreathCo project team undertook these processes, but whilst in some capacity the issues were addressed, it is argued that these processes need to be addressed in other ISA projects. By using the framework to communicate the issues, all individuals can become aware of what is being undertaken in an ISA project, and what issues need to be addressed or re-addressed through the technology's lifecycle. Whilst this section has tried to emphasise the processes as they occurred in BreathCo, these issues were only summarised within networks constructed and placed within Figures K.3 to K5 in Appendix K. It was stated that a table would be used to present the argument that the technology management process framework can add value and help build on SSM<sup>XL</sup>. The table used to present data supporting ISAEP issues is shown in Table 8.3 below along with a reminder of the learning points highlighted in Table 8.2.

Process	Supporting Data
<b>Identification</b>  <b>Learning Points:</b> 1. Community Kept Alive 2. ZPD Useful in Model Conversions	<p><i>"Well let's say SAP; to install this module we want 100K, which isn't unreasonable cost for them. You've got to look at the benefits"</i> (Interview with the Quality Manager, October 2003).</p> <p><i>"Well there'd be logged on some sort of database and, yeah could analyse the backside out of them, anytime you wanted it could link problems up and look at it by customer, by product, by region"</i> (Interview with the Product Planner, November 2003).</p> <p><i>"I mean I was involved in probably looking at a CAMS system, and there's great similarities between that and SAP, but its pointless moving to a separate stand alone, where we can integrate the whole thing into what we have running currently"</i> (Interview with the Product Performance Manager, October 2003).</p> <p><i>"Me and my boss *** [bosses name] have done, started some brainstorming on what we'd like to see on that database and if it can be done. So we've sent that to the Quality manager so it should be putting something in place at the beginning of next year for us to go into it"</i> (Interview with the Purchasing Employee, December 2004).</p> <p><i>"So we had a SAP consultant in and we also looked at three 'off the shelf' software packages that handle customer concerns stroke complaints and we evaluated all of those. The 'off the shelf' ones weren't ideal because they were general and they weren't tailored to BreathCo needs"</i> (Interview with the Quality Manager, December 2004).</p> <p><i>"Home working is going to become more of a norm rather than an exception. So if you have those, those concepts in mind then you have to deal with it"</i> (Interview with the EDP Manager, December 2004).</p>
<b>Selection</b>  <b>Learning Point:</b> 2. ZPD Useful in Model Conversions	<p><i>"So that and the addition added to the cost. So we said what else can we do? And we discovered that there was an organisation dealing with *** [another part of BreathCo] who use Lotus Notes System, that develop Lotus Notes systems. So we asked, we got them involved"</i> (Interview with the Quality Manager, December 2004).</p> <p><i>"I think the fact that we followed a reasonably established set process in that we were using a well known vendor was the best way to go"</i> (Interview with the Product Performance Manager, January 2005).</p> <p><i>"They also demonstrated that, that their prices were very reasonable, for the quality of their goods, they're very flexible, i.e., you could ring them up anytime and they would answer questions. So we judged the supplier based on the work they'd done for us in the past"</i> (Interview with the EDP Manager, December 2004).</p>
<b>Acquisition</b>  <b>Learning Points:</b>	<p><i>"We had the flow, we had everything flow charted and we had several, several continuous development meetings with *** [the developer] and Info-Tec. So different development levels we would try out"</i> (Interview with the Quality Manager, December 2004).</p> <p><i>"[Researcher] do you know how many revisions did the technology go through before a satisfactory system was developed?"</i></p>

Process	Supporting Data
<p>2. ZPD Useful in Model Conversions</p> <p>3. Training is Important When Implementing ISA</p> <p>4. Maximise Learning Opportunities</p>	<p>[Product performance manager] not of the top of my head Adrian, but there was a few, I mean if you had to say stick a number on it I would say between six or eight" (Interview with the Product Performance Manager, January 2005).</p> <p>"...I missed out or a couple of meetings but I got involved in the latter stage where I said what about this, what about that, what about the other so there was a few things missed out. I would imagine that it would be just sitting down going through these hard documents with him [the developer]" (Interview with the Customer Services Manager, January 2005).</p>
<p>Exploitation</p> <p>Learning Points:</p> <p>5. Processes to Protect ISA</p>	<p>"[Lady trainee 3] where's all this go at the end of the day like? Where's all the information go at the end of the day?</p> <p>[Trainer 2] Quality department are the process owners *** [trainees name], so we will have overall control of it, but any, anybody really can run reports off, there are management functions and admin functions within it that people are not allowed to go into. But say, I mean, we use them, often enough in this process but say *** [shipping manager] at the end of the month knows he's got a problem, he can run a report off and analyse where his problems lie. Hopefully he's got to do that and address the problems, *** [engineering manager] for engineering problems, *** [sales and marketing manager] might, the customer services manager might if there's problems related to them" (Tuesday PM Training Session, July 2004).</p>
<p>Exploitation continued</p> <p>Learning Points:</p> <p>6. Organisations Has to Provide Support</p>	<p>"I do in the view of the fact that once we've got the information, once we do the analysis, the point should be that we analyse what are our major concerns statistically and we address them through PSP each one, or not each one, but if we use the 80/20 rule, which is part of the PSP process in GREAT you should be able to identify the top three, four, five concerns we have in volume and using PSP we should be able to analyse the problem and close the gap which is the ultimate aim under GREAT/PSP" (Interview with the Product Performance Manager, October 2004).</p> <p>"Well what we're going to be doing is, when we're running reports from the concern basis, we're looking and highlighting the one that's causing the biggest concern, and we'll raise a PSP, the problem solving process team, to identify what our problems are with that and see if we can get to the root cause and try and put in a corrective action, which we have started" (Interview with the 2<sup>nd</sup> Customer Services Team Leader, October 2004).</p> <p>"Why? Because it's a good system and also dealing with concerns. At least any concern that comes into the company is logged now, where as previously somebody could have spoken to a representative, and not taken their name, and the concern could get lost and would have to be raised again by a customer. So this way it's logged down at least you've got names, and customers could, because even if they didn't get their name they could still trace it" (Interview with the Quality Managers PA, December 2004).</p> <p>"The best points for me was giving me a tool to use when I had queries to be able them to be dealt with and recorded and monitored" (Interview with the Accountant, December 2004).</p>
<p>Protection</p> <p>Learning Points:</p> <p>7. Identifying Appropriate Management Processes</p> <p>8. Make Approach to Managing ISA Explicit</p> <p>9. Manage ISA Appropriately</p>	<p>"[Male trainee 4] what about any sensitive information that's put in there? Who will see it? Who will access it? If a reps in his car and he shows a competitor all this weeks hassle we're having with *** [gives an example of a product] and all that kind of stuff?</p> <p>[Male trainee 2] does everybody have access to all the reports?</p> <p>[Trainer 3] well the Quality Department are going to be the owners of the whole thing.</p> <p>[Trainer 4] well everyone's got a view of all the concerns, reports.</p> <p>[Trainer 3] may be we should have limited view for some people" (Wednesday Training Session, July 2004).</p> <p>"That's because of the lack of whatever, to push the system out on to off site users having access to the data and causing the company problems" (Interview with the Quality Manager, December 2004).</p> <p>"Yeah, I mean there has been a couple of little tweaks made to the actual, the database itself, the fact that like putting the account number in, and the order numbers come up in one way. It would be better for them to come up in another way. So there has been a couple of minor modifications done on that" (Interview with the Customer Services Manager, January 2005).</p> <p>"They [EDP department] update information, I would imagine on a weekly basis with the, the input of customer accounts and any revised accounts that need to be sorted" (Interview with the 2<sup>nd</sup> Customer Services Team Leader, January 2005).</p> <p>"There are, every night we run a back up so, the data's backed up every night and we can go back two weeks from the devices we have here. The back up tapes are located in a fire proof safe over the road there, so it's in a safe environment" (Interview with the EDP Manager, December 2004).</p> <p>"Well I took out a support contract with them [Info-Tec], just in the early part of the, of the development, post go live. I think its always wise to have a contract in place in case some nasties</p>

	<i>come out of the wood work, which you hadn't anticipated"</i> (Interview with the EDP Manager, December 2004).
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Table 8.3

*Evidence of Identification, Selection, Acquisition, Exploitation, and Protection (ISAEP) Issues Being Undertaken within BreathCo*

Table 8.3 has been constructed to further highlight and argue that the process of ISAEP were undertaken as part of the CCM project, even though it was in a more ad-hoc basis. These processes should be conducted in a more structured format than the technology management process framework allows. It should also be noted that within Table 8.3, a number of learning points are located within the 'process' column of the table. These learning points correspond to the learning points that were drawn out through the CCM project for identifying issues; e.g., a second framework would need to take account of ISA implications and management aspects of a project. It is argued that firstly, by formally addressing ISAEP issues that the learning points identified can be achieved. Secondly, by addressing ISAEP issues it will provide a number of processes that a project team can focus on, and discuss, when undertaking an ISD project.

In order to summarise the technology management issues of the CCM project, a network has been constructed. The network demonstrates the processes required as part of ISAEP issues and how they link to technology management which can be undertaken within BreathCo. This network is quite complex and is therefore shown in Figure K.6, Appendix K. The important issues that are shown within Figure K.6 will now be discussed. Figure K.6 of Appendix K can be considered in two parts. The bottom half relates to the issues with using the ISA whilst the top half relates to the management aspects of ISA that have been uncovered through this research, and argued for in this chapter.

It was suggested that an individual's role within an organisation would relate to how the project team was assigned and which individuals would use the ISA once implemented. This use, or lack of use of the technology can relate to perceiving negative or positive perceptions of the ISA. This thinking is considered due to the usage of the concerns technology (the code 'concerns project IS use' has therefore been applied). 'Concerns project IS use' is thought to be associated with 'IS use' in general, which is located in the top part of Figure K.6, Appendix K where IS



management issues are dealt with. 'IS use' can have positive and negative effects on individuals, departments, or an organisation as a whole. However, it has been argued that these issues can be managed by using formal IS management procedures, such as the issues relating to the technology management process framework (consisting of IS identification, IS selection, IS acquisition, IS exploitation, and IS protection).

Time issues were a problem uncovered throughout the research, and were also believed to apply to other issues associated to BreathCo's operations, in addition to the CCM project. This issue is shown at the top right of Figure K.6, Appendix K, with both positive and negative time issues being displayed. If individuals were not able to spend time with ISA, including the concerns technology, they could not participate in exploiting the advantages envisioned. 'IS not being used to enhance the organisation' has been linked to negative time issues, as this was implied as the main inhibitor in using technologies and other processes designed to help individuals within BreathCo. It is considered that firstly, if time was available ('time issues positive') for individuals, they could use ISA to enhance their organisation. Secondly, if ISA can be exploited, more time can be made available to individuals, which was stated by the product performance manager to be one outcome of the CCM project. Other issues relating to time concerned the size of a project team on a project, in terms of moving a project forward either slowly or quickly. This issue then links to the process of project team assignment that links back to the bottom part of the network as shown in Figure K.6 of Appendix K.

If the technology management process framework (TMPF) is to be used with SSM<sup>XL</sup> to form a learning framework for ISA design, implementation, and management, whether the second TMPF framework would be compatible with BreathCo's overall technology management process needs to be considered. If it is not, then a complete learning framework would be unsuitable for a project team, as it would conflict with BreathCo's general technology management process. This issue is now explored through BreathCo's current technology management process.

### **8.6.3 Information Systems Management Issues with Relation to BreathCo**

The EDP manager, when he was interviewed, discussed current IS strategies in relation to BreathCo. In a similar manner to how the analysis of the collected data

was presented in the previous section, networks were constructed to investigate these issues. These will not be presented here but can be seen in Figures K.7 to K.9 of Appendix K. The thinking the EDP manager displays regarding the concerns technology and its relation to IS strategies (see Figure K.7 of Appendix K) can be summarised as:

- There is an IS strategy developed within BreathCo's parent company but what it is, is unknown.
- The EDP manager bases his IS strategy on the requirements of BreathCo unless the parent company specifies differently.
- The IS strategy for BreathCo is developed over a twelve month period with any remaining actions being carried forward to the next year.
- The IS strategy is based around user requirements as well as issues that the EDP manager acknowledges requires addressing.

These outcomes show that while an IS strategy is developed, the process is undertaken by the EDP department. From these issues, it may be argued that any team implementing an ISA requires support from the EDP department, and needs to carefully structure the processes to be undertaken so that they fit with issues that the EDP department undertakes. It is argued again that the technology management process framework can achieve this task more formally.

Whilst management issues were explored in relation to the concerns technology, this particular perspective considers technology management as a higher level function in BreathCo. If technologies are managed differently to the way it is intended to manage the CCM project, the technology management process framework argued for may provide limited value to other members of the organisation. This limited value could be because the TMPF interferes with BreathCo's technology management processes, for example. The issues identified in Figure K.8 of Appendix K include:

- EDP requires knowledge of IS projects so they can provide advice and support for the technology.
- ISA need to be formally proposed and costed out before being implemented.

- BreathCo does not want to be in a position to have to pay somebody if issues needed clarifying or simple questions about ISA need answering.

What these issues demonstrate is that the EDP manager could also get value from using the TMPF, as he would have the knowledge of what attention specific ISA will require. These management issues are considered to derive from the current IS mix available within BreathCo to undertake its business objectives, where the management of ISA are also perceived to be related. It is perceived there is a link between the IS strategy and the business strategy as shown in Figure K.9 of Appendix K.

This section has tried to identify particular issues that BreathCo undertake with the management of technology. What was identified and can be posed is that BreathCo do not follow a formal model to undertake technology management processes. Project teams within BreathCo therefore could use the developed approach in this research to help implement and manage the ISA that they are connected with, while the technology would be included in BreathCo's technology roadmap and can also be managed at a higher level. This thinking comes from the following bullet points that have been drawn out through the data:

- EDP has many issues to address.
- EDP support ISA but look to individuals or departments to implement ISA.
- EDP need to have knowledge of what is going on but do not necessarily have to get involved in any development.
- BreathCo do not have any formal process for undertaking ISA implementation and management besides the GREAT procedure.
- Higher issues are addressed by such as IS strategies by EDP, and how it can be linked to the business strategy in conjunction with senior management, whilst lower level IS issues are left to departments and teams who have been involved with an ISA.

Through these points, it is argued again that the CCM project team, as well as other individuals and departments, use the technology management process framework as it has been identified. The TMPF can help with the management issues and

communicate with the EDP department to supply the knowledge they require of the ISA. This concludes the data that was identified to explore the usefulness of the adapted TMPF. It was through this data that it is argued that SSM<sup>XL</sup> can be joined with the TMPF to create what has been labelled in this research as a Soft Systems Methodology eXpanded for learning incorporating Technology Management (SSM<sup>XLTM</sup>).

### **8.7 Summary**

This chapter began by exploring the issues of ISA implementation, training, further implementation, maintenance and use issues associated with ISA, and ISA management issues. These issues occurred through the second cycle of action research as part of the BreathCo Customer Concerns Management project. It has only been through drawing out the learning points and data presented in this chapter that the adapted technology management process framework (TMPF) could be argued to be valuable for individuals who wish to implement and manage an ISA. Whilst the theory of the TMPF has been presented in Chapter Four, this chapter has strengthened the argument that such an approach can be used to follow the work undertaken as an outcome of the SSM<sup>XL</sup> framework. By combining the two frameworks together, it is argued that a learning framework to enable more effective problem exploration, information systems planning, implementation, and management can be created. It is this learning framework, labelled as Soft Systems Methodology eXpanded for learning incorporating Technology Management (SSM<sup>XLTM</sup>) that is the main contribution to knowledge as reviewed in Chapter Four section 4.5. By identifying such a framework through theory and practice, it was deemed necessary to re-test the learning framework on another project in another organisation. This was the smart card project and the organisation was part of the National Health Service (NHS). The next chapter deals with this case, the learning framework and concludes by evaluating the learning framework.

## Chapter Nine: The Smart Card Project and an Evaluation of the Learning Framework Developed

### 9.0 Introduction

Having undertaken the primary research at BreathCo, the result was a SSM<sup>XLTM</sup> framework. Following this, the perspective was offered that this complete SSM<sup>XLTM</sup> framework should be re-tested. To re-test SSM<sup>XLTM</sup>, a case was sought that required the implementation of an information system application (ISA), where the achievement of further learning was desired throughout the process. By using SSM<sup>XLTM</sup> the aim was to achieve this. Undertaking a second case also allowed firstly, contemplation of the practicality of the overall approach; and secondly, exploration of how SSM<sup>XLTM</sup> would work in a different sector, as well as with different participants. This is important, as the issues and conclusions drawn from the first case may only be specific to BreathCo. Different individuals within another organisation may proffer different issues, and allow different conclusions to be drawn. Doing this not only adds value to this work, but also can enable further refinements and future research objectives to be stated.

It is not the purpose of this case to provide the rich description that was made available for the BreathCo case. This detail therefore, is provided in Appendix L. The purpose of this chapter is to firstly, summarise the issues and learning points drawn out from the earlier phases of the SSM<sup>XLTM</sup> framework. Secondly, identify any further learning points in undertaking the case that either support or highlight problems within the developed SSM<sup>XLTM</sup> framework. This allows any required refinements to be made. Thirdly, this chapter focuses on the analysis of the case, with particular attention being placed on the latter stages of SSM<sup>XLTM</sup> and how it could be used by individuals within the organisation. Finally, this chapter provides a detailed discussion and an evaluation on a number of issues relating to this research.

### 9.1 The HealthCo Case Outline and Practical Work Undertaken

The case where SSM<sup>XLTM</sup> was re-tested was part of the National Health Service (NHS). The organisation labelled as HealthCo (not the organisations real name) had

to investigate and implement a smart card application. The ISA would allow all individuals that make up HealthCo, in addition to new starters, to be issued with a smart card. The main focus of this project concentrated on new starters entering the organisation and individuals who are leaving the organisation.

A report detailing the current starter and leaver process was delivered to HealthCo, as well as details of how individuals receive and discard their current identification (ID) badges. In conclusion, the report offered suggestions on who should use the ISA and issue the new smart card. This process can be seen to encompass phases 1 – 5 of SSM<sup>XLTM</sup>. On delivery of the report, it was planned to leave the participants to revisit phase 5 and undertake phases 6 and 7 of SSM<sup>XLTM</sup>. Due to the project being suspended just after the report was delivered, phases 6 and 7 were not undertaken. The remainder of SSM<sup>XLTM</sup> (phases 8 – 12) however, will be discussed with reference specifically to HealthCo. Undertaking the work this way, will add to the thinking that went into SSM<sup>XL</sup>, the adopted technology management process framework (TMPF), and hence SSM<sup>XLTM</sup>. To begin the work undertaken throughout the earlier phases of SSM<sup>XLTM</sup>, can be seen in Figure 9.1.

Figure 9.1 shows the issues and aspects that were involved in undertaking the first phases of SSM<sup>XLTM</sup>. Whilst the project was seen to be quite structured, in respect of information technology and software selection, a problem situation was perceived in determining the details of which department would be responsible for issuing the smart cards. These issues are concentrated on in Appendix L as the process for re-testing the earlier phases of SSM<sup>XLTM</sup>. The main themes and learning points drawn from Appendix L are now listed.

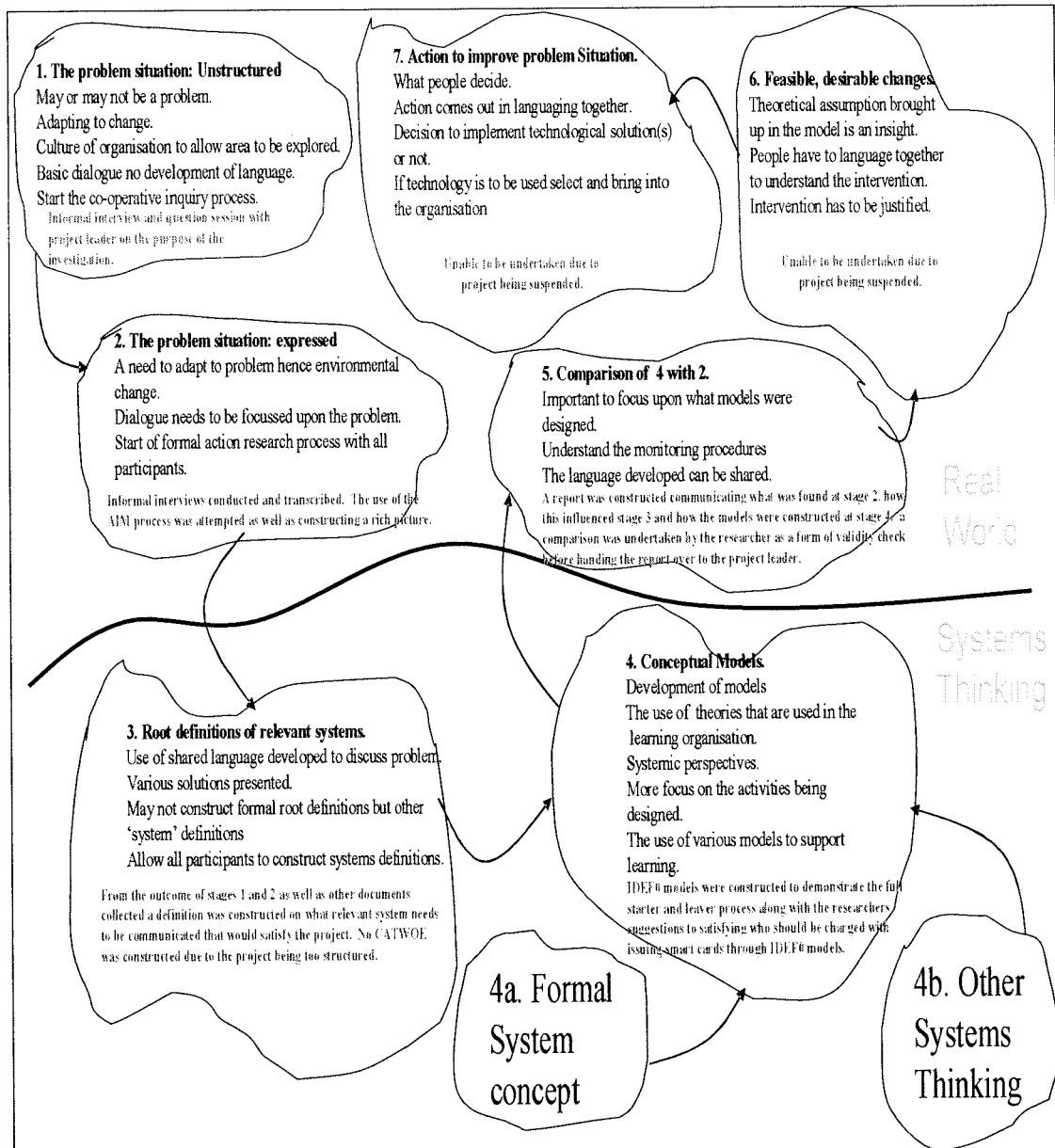


Figure 9.1

*The Soft Systems Methodology Expanded for Learning Incorporating Technology Management with Activities Undertaken at HealthCo*

## 9.2 Summary of the Main Issues and Learning Points Identified through Using the Soft Systems Methodology Expanded for Learning Incorporating Technology Management Framework

An informal meeting was held with the project leader (the Information Manager for IT) where he sketched out his mental model on the current starter and leaver process. Whilst a participative approach was promoted to the information manager, he suggested the researcher conduct the investigation. This led to the following learning point:

- Whilst a greater amount of participation may be sought in order to try and undertake a form of co-operative inquiry, this may not be possible. If a project leader or other individuals, who hold power, do not want to use this approach, a researcher may have to undertake the project themselves and seek participation through other processes, or leave the problem situation unresolved.

Through an interview list that was drawn up, a number of participants were spoken to, observed, and interviewed, to help explore and structure the starter and leaver process. To accompany the current investigation, a pilot was conducted of the ISA software, that will be required to issue smart cards. This allowed the researcher to see first hand what the software looked like and how it has to be used. Whilst the participants who were at the pilot could also observe and learn further about the ISA and any perceived problems, a problem arose around how these could be communicated to all participants. This led to a further three learning points.

- A lack of participation or co-operative inquiry at phase 2, leaves the structuring of the problem situation to a third party, which can detract from any learning that could be achieved.
- Tools designed to help explore unstructured problems may not provide much value in more structured problem situations. Other techniques therefore may be required to explore more structured problem situations.
- Fuller participation is required during phase 2, to try and use the theories of the learning organization. To do this, tools such as AIM and rich pictures need to be used and made explicit to all the participants who are working together.

It was left to the researcher to make the recommendations on how the participants take purposeful action. The modelling phases of SSM<sup>XL™</sup> was undertaken by the researcher in isolation away from the research site. Three root definitions, CATWOE analysis, and conceptual models were developed based on the outcomes of phase 2. By modelling these perspective 'systems', three further learning points were drawn.



- When modelled, more structured problem situations could still provide different perspectives, and help explore more suitable 'systems'. Even though a problem is more structured, learning activities can still be created through the use SSM<sup>XLTM</sup>.
- Participation in the problem situation by individuals needs to occur at some point when using SSM<sup>XLTM</sup>.
- Phase 5 could be used to try and encourage greater participation from individuals to re-visit phase 2 themselves, or use the models that have been produced at phase 4, to try and enact theories of the learning organization, which was the intent of the learning framework. It is believed that greater participation in the research process is required for this to be achieved.

In an attempt to try and create the learning that the SSM<sup>XLTM</sup> framework encompasses, as well as satisfy the project leader, a report was written detailing the findings. Modelling undertaken within the report adopted the use of IDEF0 software. While different to conceptual models, IDEF0 is argued to take a systems perspective in assembling processes, by not focusing on what can be compared in the real world. The IDEF0 models that were used showed a number of different levels of the 'system' and how they relate. The learning point that was drawn from this is stated as:

- A researcher or consultant using SSM<sup>XLTM</sup> while trying to uphold the 4E's, may find the testing of personal mental models restricted. Using a co-operative approach allows greater testing of personal mental models, as other participants are involved in collecting and owning the data, which could enable a greater number of mental models to be tested.

It was considered that by forming root definitions, CATWOE's, and conceptual models and then using the IDEF0 software, the researcher learnt a great deal about the starter and leaver process and the proposed smart card application. It was unknown if this learning was distributed to the other participants of the project. The report was presented back to the project leader in March 2005. The reviewing of the report, models, and a comparison of the data collected at phase 2, by the project team, was proposed to be discussed. This did not happen due to the National Programme for

Information Technology (NPFIT) identifying a similar process as being undertaken for another part of the NHS. A proposal was made to join the issuing of smart cards with these other applications. Essentially, at the end of March and early April 2005 the smart card project was suspended. Whilst this may not have enabled the re-testing of the first phases of SSM<sup>XL™</sup>, it had provided a number of learning points to consider. As the project was suspended, another way had to be sought to explore the issues of the SSM<sup>XL™</sup> framework in practice. This is explored in the next section.

### **9.3 Analysis of how Soft Systems Methodology Expanded for Learning Incorporating Technology Management Worked within HealthCo**

Having undertaken the initial stages of the project (see Appendix L), and coming to the conclusion that there would be no resolution to the suspension of the project, another way to investigate the usefulness of SSM<sup>XL™</sup> had to be found. A decision was made that interviews could be used to probe participants on current issues in relation to IS design, implementation, and management. By undertaking these interviews, the captured data could be used to compare the proposed outcomes of SSM<sup>XL™</sup>, to try and judge the usefulness of SSM<sup>XL™</sup>, if used in the context of HealthCo.

Five participants were interviewed in order to try and undertake this comparison. The participants that agreed to be interviewed were the workforce planning manager, and the personnel director, who were interviewed together, the IT security manager, his co-worker the IT security employee, and an IT project manager. The participants represented individuals who are affected by, or are involved in, IS projects. Whilst the participants were not exactly the same as those interviewed for the first part of the project (see Appendix L), it is argued these participants were managers who are more senior and have more direct links to IS projects. These participants could provide more suitable and accurate data, in light of the smart card project being suspended. The interview questions can be seen in section H.5 of Appendix H.

As the main data about the starter/leaver process was collected and interpreted by the researcher, an inquiry was made into how such an investigation would normally have been undertaken. The personnel director, workforce planning manager, and IT project manager pointed towards individuals within IT as undertaking the investigation. The

workforce planning manager stated that due to the report delivered; more key individuals from Personnel have been included in the project. This may imply that as a result of the report, further issues have now been highlighted and individual's mental models being challenged. The models and other IS modelling techniques, may be the start in enacting the learning organization conditions, as designed. A problem in the use of SSM<sup>XLTM</sup> could relate to how HealthCo traditionally undertake IS projects. For example, the IT and the information department would usually carry out these projects, so how these individuals see incorporating other participants and their perspectives is of importance. To test this, how would this project would have been undertaken if another individual had been involved, was put to the IT security manager. The IT security manager offered the perspective that IT security would be involved with individuals who had already received the registration authority training. The IT security employee agreed to an extent with his colleague, but added that Personnel would be involved, as well as HealthCo's audit employees, who are also responsible for highlighting limitations in current HealthCo procedures. It can be stated using these answers that HealthCo would try to include individuals and departments that the project could affect, but as it is essentially an IT project, it would be led by the IT function.

The purpose of creating the models was to try and encourage dialogue and develop a shared language. The current approach to undertaking such a project is to use principles from the PRINCE methodology. The IT and information department would undertake more structured modelling based on what *they* think currently happens and how *they* think it should be undertaken, without any consideration for other perspectives. Using SSM<sup>XLTM</sup> as a way to think about the problem, is argued to remove the bias of thinking in just one way. Removing such bias in this way, may provide another problem and this needs to be examined. For example, how would the participants react to a different approach, and could the approach be used as a catalyst in the future. To accompany the issue of using SSM<sup>XLTM</sup>, other issues requiring investigation are; if more structured approaches are usually undertaken as part of a ISA projects traditional mapping phase; how would such a perspective be used; and finally how would participants consider having to discuss the outcomes.

To communicate the findings, how good the models were, was presented to the interviewees. The personnel director, the workforce planning manager, the IT project manager and IT security manager stated that they were very suitable for communicating the findings. The IT security employee also agreed, “*yes, the flow models were good*” (Interview with the IT Security Employee, September 2005). Whilst all interviewees agreed that the presented models were good, whether they could be able to undertake a similar process in future projects, needed to be explored. The personnel director, workforce planning manager, and IT security manager, agreed that they could undertake a similar process as that laid out by this researcher. The IT project manager stated, “*yes, we would have done exactly the same as you*” (Interview with the IT Project Manager, September 2005). The IT security employee also agreed when he stated, “*yeah, I’d like to think so*” but added, “*finding the time I suppose, but yeah*” (Interview with the IT Security Employee, September 2005). These responses could be argued to imply that the exploration and modelling phases could be undertaken in another project. It cannot be stated that the framework could be used in exactly the same manner, without formally revealing the SSM<sup>XLTM</sup> framework, and receiving the participants’ feedback.

Whilst the purpose of SSM<sup>XLTM</sup> was to try and enact learning organization conditions, it was hoped the report would draw out different thinking to the original thinking. The IT security employee expressed that the report had allowed his thinking to change. This was put down to the modelling and formalised process being communicated, which allowed discussions to be undertaken. Previously, nobody could state explicitly that the process for starters and leavers worked in a particular manner. The IT security manager acknowledged that his thinking had not changed, except in respect the issues that Personnel have to deal with. The IT project manager echoed the thinking of the IT security manager by stating that the outcome did not affect his thinking personally, but for other departments thinking has changed. Finally, the personnel director and the workforce planning manager were not really sure. They stated that this was perhaps a question for the IT function, that will carry out the project. This was surprising, as it may become a Personnel (HR) function in the future. As the personnel director and the workforce planning manager are responsible for a number of processes that need to be formalised, they might be aware of the issues of starter and leaver processes, and other departments who read the

report may alter their thinking about issues that Personnel undertake. Whilst this shows that all participants were able to read the report to some extent, it again emphasises the need for greater participation in undertaking such an ISA project. This increase in participation could come from more of an emphasis on co-operative inquiry; so all participants would own the data, and it may allow participants to test mental models on issues such as who should be responsible for a project (e.g., the IT department), which the personnel director believes.

**Learning Point:** *Modelling and other communication techniques, based on the principle of systems thinking, allows participants to question and alter their thinking about issues relating to an ISA project. Participants however, need to either undertake the investigation or be able to access any data, so this process can be achieved.*

The technology management aspect of SSM<sup>XL™</sup>, attempts to focus a project on a number of processes that need to be discussed and charted throughout an ISA life. While less concerned with the more hard structured aspects that SSM<sup>XL™</sup> could employ, how the current issues will be tackled, was probed with emphasis on looking at the previously stated benefits. The personnel director and workforce planning manager believe that a comparison will be used, before the project has been completed, and when the smart card is in full use. Other methods will identify how quickly information can be assessed, as well as how robust the process remains. How this will be conducted and dialogued can be important. The personnel director and the workforce planning manager believe an audit will be used as the evaluation tool. Who would undertake this audit is unknown. Again, it may be an IT function and therefore, the same issues of ownership of the data, and the way it is connected, are important. Involving participants included in the earlier phases could be vital, as it may enable the learning activities generated earlier to be incorporated in such an audit. This will also allow the dialogue and language to be further developed, as the ISA is monitored to make sure the benefits are being reached.

The IT project manager could not state when he would know if the ISA benefits will have been met. This may be related to his role as an IT project manager. He may just

be required to complete the project, get the paper work signed off, and move onto the next project without any thought to how the ISA will perform in the future. The IT security manager sees patient satisfaction as measuring the benefit of the project.

*“The national waiting list figures, we know that’s a success because its actually cut down a lot of work with our information services because they can now just log on, do it because they don’t have to type stuff up and get it sent, e-mailed, you just log on and enter the figures nationally”* (Interview with the Security Manager, September 2005). The IT security employee states the benefits will be reached when all employees have received their smart card and can access all applications they are required to.

The examples given as the benefits of the project, show that whilst the smart card project needs to be implemented, it is also linked to other aspects within HealthCo. Along with these issues, a number of benefits are envisioned as well as a number of processes that can be undertaken to monitor the benefits. These issues can be used to strengthen the argument that value can be added by using the technology management aspect of SSM<sup>XLTM</sup>, as a process for continuing the learning produced in the early phases, and taking it forward through the life of an ISA project. The IT security employee states, all employees need to receive their smart card first, this relates to full implementation of the project. At the time, the project had only undergone the pilot. This was similar to the BreathCo project. It would be interesting to explore the technology management aspect of SSM<sup>XLTM</sup> if a pilot was required for IS projects within HealthCo, and also does this add to the learning that an ISA project can produce.

The workforce planning manager and the personnel director elaborated on projects where pilots were undertaken, as well as those where they were not. They concluded that the bigger projects within HealthCo are rolled out gradually, in comparison to moving from the old to the new. In respect of answering the question directly, it was found that not all ISA projects required a pilot. The IT project manager made a valid point referring to particular technologies and the size of a project,

*“if it’s a tried and tested application, it goes live everywhere in the same place. If it’s something like the PAS system [patient administration system] it can’t be piloted, it’s*

*still got to go live. It depends very much on the application. I mean usually if it's a new technology, you will probably pilot it"* (Interview with the IT Project Manager, September 2005).

The IT security manager believes eighty percent of ISA projects are piloted, whilst the IT security employee states the bigger projects receive some kind of pilot. These responses could be taken to imply that whilst IS development may not be undertaken through a pilot, the ISA needs to pass some form of test before going live.

Acquisition therefore may take many forms and needs to be made clear, so an ISA can be exploited more effectively. How the findings of such acceptance tests or pilots are communicated, may also need to be taken into account within the acquisition phase of SSM<sup>XL</sup><sup>TM</sup>. It was important to explore how the pilot of the smart card was communicated, if the findings had an overall effect on the project; as well as if a training plan had been designed, so that participants who would issue smart cards would have the appropriate knowledge to use the ISA. These issues are explored in Table 9.1.

Participant	How were the findings of the pilot project communicated?	Will the findings of the pilot project affect the overall project?	Is there a training plan for this information system application?
Personnel Director and Workforce Planning Manager	The group who had been identified within human resources was dealing with the findings. Unknown how they were communicated.	Expect it to, if it becomes part of the human resources function.	Yes. Thought to relate to the registration authority training.
IT Project Manager	Still has to be undertaken.	Unknown until it has been formally undertaken.	Yes.
IT Security Manager	Undertook the pilot so noted the feedback was good. Most feedback was going back to departmental managers and not to the project team.	Yes, lessons have been learnt from the pilot.	Yes externally and internally.
IT Security Employee	Through e-mails to the registration authority. Constant meetings with the team.	Yes, finding out what hardware is not working correctly.	Yes externally and internally.

Table 9.1

*How the Findings of the Report were Communicated, what Affect it had on the Findings, and Issues Associated with Training*

Table 9.1 has highlighted that firstly, the findings of the pilot may not have been communicated fully as yet. This may be because the project was suspended. What is clear is that the findings of the pilot can affect the overall project with lessons being learnt. Before any project is fully rolled out, it is important to focus on what was thought to work in theory, works in practice. This could mark the final aspect of an IS project before the ISA becomes implemented in an organisation. The National Programme for Information Technology (NPFIT) may have undertaken identification and selection procedures, but the individuals of HealthCo had to ‘acquire’ the information system application into the organisation, and start exploiting and protecting the technology. This can add to the argument that the SSM<sup>XL™</sup> framework designed has value. An example of how SSM<sup>XL™</sup> has, and could be applied to the smart card project at HealthCo, can be seen in Figure 9.2.



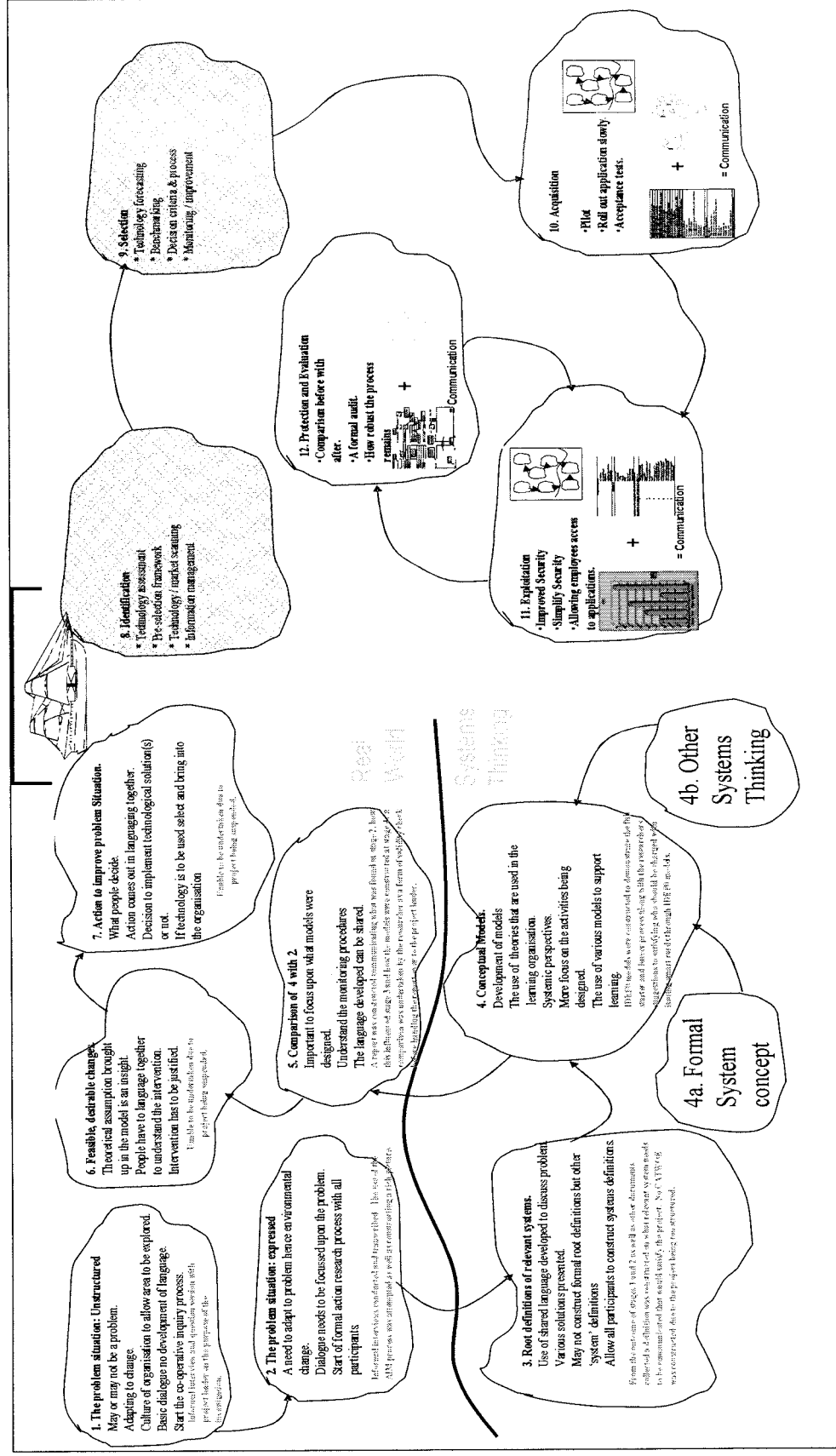


Figure 9.2

The Soft Systems Methodology Expanded for Learning and Incorporating Technology Management Framework that could be Applied to the Smart Card Project for HealthCo

Figure 9.2 displays the practical work undertaken in investigating the problem situation, of who could use the ISA to issue smart cards. The problem is that phase 5 needed to be formally undertaken by the participants. On taking action to improve the problem situation, HealthCo will have discussed a variety of perspectives and decided on the best course of action for issuing smart cards. The problem is that the ISA has not been identified and selected in this case, as it has been organised externally. HealthCo therefore, are left to acquire the already selected application, exploit the ISA, and protect and evaluate the technology if SSM<sup>XLTM</sup> is used. The issue of, if the participants used SSM<sup>XLTM</sup>, how suitable would the SSM<sup>XLTM</sup> framework be, and how would such an approach generate learning, also needs to be explored.

As the remaining processes of SSM<sup>XLTM</sup> (Acquisition, Exploitation and Protection and Evaluation) have not been undertaken, it is unknown how successful the approach would have proven. In order to examine this issue, the responses of the interviewed participants are used to demonstrate how successful the second part of SSM<sup>XLTM</sup> would be, if used, within HealthCo. In order to do this, the follow up interviews asked the participants a series of questions that concerned ISAEP issues within HealthCo generally. The responses are grafted onto Figure 9.3 below.

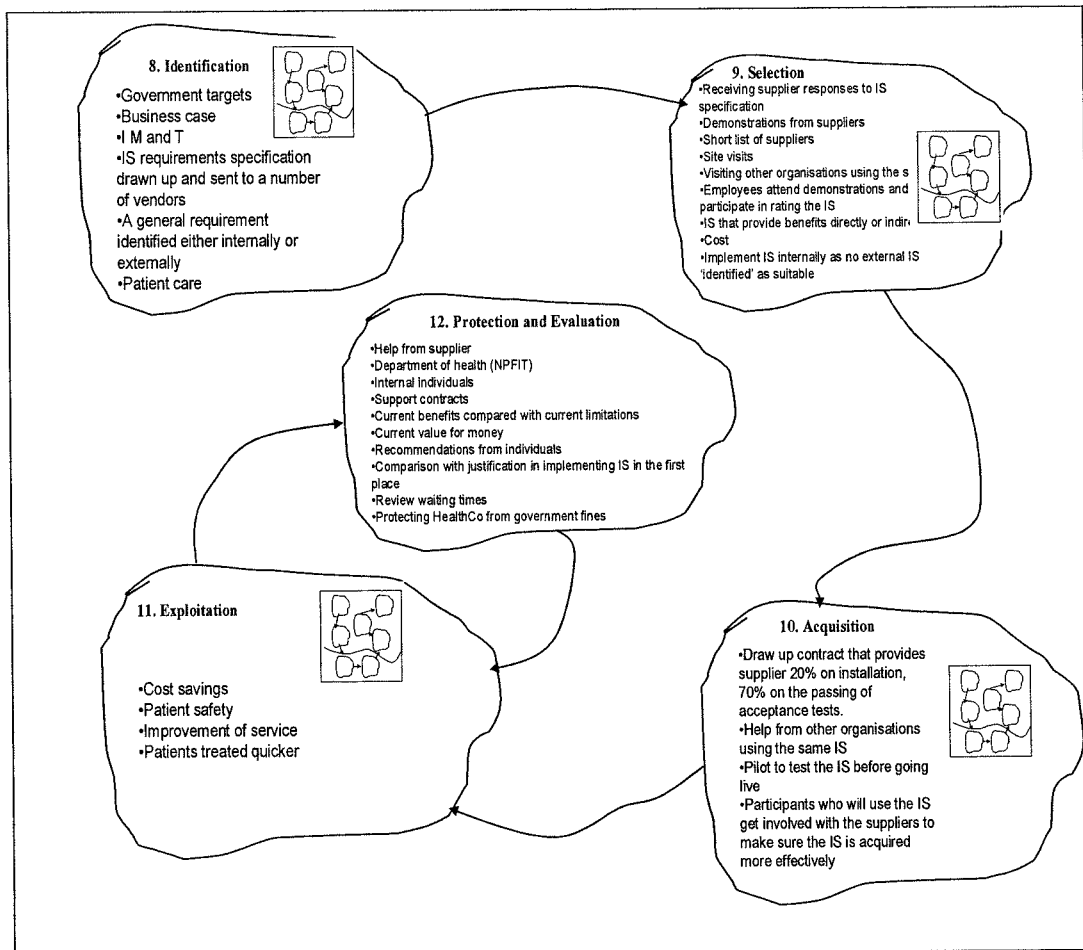


Figure 9.3

*The Latter Phases of the Soft Systems Methodology Expanded for Learning  
Incorporating Technology Management Framework with Issues Uncovered from the  
HealthCo Case*

Figure 9.3 has been constructed to explore how HealthCo currently undertake ISAEP processes. As can be seen, each element could use a number of techniques to formally undertake ISAEP issues. Whilst identification and selection issues have been reviewed, they are undertaken in some capacity for other projects, but are not considered as playing much of a role in the smart card project. Identifying IS could come from the government, from ISA vendors or from identifying issues internally. These processes provide HealthCo with a number of avenues to identify suitable IS. Selection strategies for example, can be undertaken using the responses from ISA vendors, by undertaking the identification process (an example of down stream flows as discussed by Phaal, Farrukh and Probert, 2004c), site visits to vendors or other organisations, or by implementing an ISA internally. As has been reviewed, acquisition could take the form of a pilot which was undertaken for the smart card

project. Other processes may include acceptance tests with a slow roll out of the application, within the chosen department where the ISA can be fully exploited. Exploitation has been stated to include improved security as well as simplifying the security process and increasing patient satisfaction. Finally, the ISA needs to be protected and evaluated. These processes were stated to include a before and after comparison on, how robust the process remains, and using formal audits to identify any weaknesses. Using the interviews to draw these issues together, demonstrates the number of alternatives available for HealthCo. These choices could depend on the problem, the potential size of the project, and the intended end users. It is argued that SSM<sup>XLTM</sup> could be used to start exploring problem issues and help implement and manage an ISA within HealthCo, even though individuals within this organisation undertake such processes already. The advantage comes from the complete approach (phase 1 – 12) as opposed to just problem exploration, or IS management, even though SSM<sup>XLTM</sup> can be used in this way if participants wish.

Whilst the participants state how the other processes could be undertaken, it is unknown whether these processes would be enhanced or not by using SSM<sup>XLTM</sup> for the smart card project. The issues stated could represent acquisition, exploitation, protection, and evaluation processes. These processes could and have to some extent started to be used for the smart card project (e.g., a pilot study). The SSM<sup>XLTM</sup> framework could add value in communicating these issues, if learning organization conditions can be developed, allowing enhanced communication to take place between members of the team. This can only be speculated however, as full use of SSM<sup>XLTM</sup> was not possible on the smart card project. What can be concluded is that processes that HealthCo undertake, can be argued to represent the processes that make up SSM<sup>XLTM</sup>.

**Learning Point:** The SSM<sup>XLTM</sup> framework could add value to a project that is in essence structured with an ISA having already been identified and selected. This value however, may only represent enhancing the dialogue and language development by discussing how the processes should be undertaken. It however is still valuable and is essential for IS projects.

**9.3.1 Removing the Perception of Resistance of Information System Applications through Using the SSM<sup>XLTM</sup> Framework**

With the smart card project being identified externally, and being in a sense pre-selected, participants may resist the approach to ISA implementation, as they have not had more say in the process. The outcome could then be used to determine how SSM<sup>XLTM</sup> could help. The IT security manager states that due to the national programme failing to deliver suitable ISA, individuals are cynical about IS projects. The IT security manager argues ISA that have been implemented and do not meet expectations have especially contributed to this cynicism (Interview with the IT Security Manager, September 2005). The IT project manager also states the perception of IS is one of disappointment. Some of the main problems are the disappointment that has come from the national programme failing to deliver suitable ISA, other issues relating to the secrecy surrounding ISA projects, and not being able to see the proposed ISA (Interview with the IT Project Manager, September 2005). The personnel director and the workforce planning manager observe IS projects as having critics, but state that overall individuals perceive ISA positively, if they deliver what is promised. They continue by discussing the ISA that their department have to use, and argue that due to the ISA usefulness, in comparison to working manually, the ISA is perceived with a positive attitude. They add that individuals were involved with the design and implementation of the particular ISA in question, which might be why it was perceived positively (Interview with the Personnel Director and the Workforce Planning Manager, September 2005).

It can be summarised that the perception of IS within HealthCo is not great, with the national programme contributing to this dissatisfaction. As a result of this perception, the amount of resistance encountered if ISA are not well selected and acquired was investigated. The personnel director and the workforce planning manager argue that resistance depends on the ISA, and what it is intended to do. They continue by giving an example of a previous ISA which was received positively due to the value it had added to their department. It was stated the accompanying training programme reduced resistance (Interview with the Personnel Director and The Workforce Planning Manager, September 2005). The IT security manager argues resistance occurs with clinicians, if they perceive the ISA takes time away from treating patients. Any ISA perceived to give more time to treating patients therefore, is received

positively (Interview with the IT Security Manager, September 2005). It can be summarised using these perspectives that resistance is overcome when individuals participate in the project, as well as implement an ISA that provides a clear benefit in an individual's job. It can be theorised that IS projects initiated by the national programme may not be so well received, as participation is minimal.

It is envisioned participation can be increased if the SSM<sup>XL™</sup> framework is used, even though the national programme has essentially identified and selected the smart card application. Whilst the project is to a degree structured, as this research has emphasised, there is still a need for participation. This participation would come firstly, from undertaking the problem exploration phases, as the issue of who should be responsible for issuing smart cards needs to be explored. Secondly, participation should be encouraged in making explicit how the ISA should be acquired and exploited (e.g., making the chosen departments jobs easier through the ISA); unfortunately the problem exploration was undertaken in isolation, at the request of the participants of HealthCo (the participatory aspect of the research). When an attempt was made to emphasise the advantages of SSM<sup>XL™</sup>, it was down to the participants to try and dialogue these issues. However, the project was suspended. Having undertaken research at HealthCo a number of learning points were drawn. These are repeated here again in Table 9.2 below.

Issues	Learning Point Drawn
Using the SSM <sup>XLTM</sup> framework in a co-operative way to advance the learning activities that can be achieved.	<p>1. Whilst a greater amount of participation may be sought in order to try and undertake a form of co-operative inquiry, this may not be possible. If a project leader or other individuals, who hold power, do not want to use this approach, a researcher may have to undertake the project themselves and seek participation through other processes, or leave the problem situation unresolved.</p> <p>2. A lack of participation or co-operative inquiry at phase 2, leaves the structuring of the problem situation to a third party, which can detract from any learning that could be achieved.</p>
Exploring how the SSM <sup>XLTM</sup> framework can be used on more structured problem situations.	<p>3. Tools designed to help explore unstructured problems may not provide much value in more structured problem situations. Other techniques therefore may be required to explore more structured problem situations.</p> <p>4. Fuller participation is required during phase 2, to try and use the theories of the learning organization. To do this, tools such as AIM and rich pictures need to be used and made explicit to all the participants who are working together.</p> <p>5. When modelled, more structured problem situations could still provide different perspectives, and help explore more suitable 'systems'. Even though a problem is more structured, learning activities can still be created through the use SSM<sup>XLTM</sup>.</p> <p>6. Participation in the problem situation by individuals needs to occur at some point when using SSM<sup>XLTM</sup>.</p>
If the SSM <sup>XLTM</sup> framework is to be used successfully, participation by participants of the problem situation has to be obtained at some point. A researcher or consultant cannot obtain the advantages that the learning framework promotes on their own.	<p>7. Phase 5 could be used to try and encourage greater participation from individuals to re-visit phase 2 themselves, or use the models that have been produced at phase 4, to try and enact theories of the learning organization, which was the intent of the learning framework. It is believed that greater participation in the research process is required for this to be achieved.</p> <p>8. A researcher or consultant using SSM<sup>XLTM</sup> while trying to uphold the 4E's, may find the testing of personal mental models restricted. Using a co-operative approach allows greater testing of personal mental models, as other participants are involved in collecting and owning the data, which could enable a greater number of</p>

Issues	Learning Point Drawn
	mental models to be tested.
Whilst the development and management aspect of the SSM <sup>XLTM</sup> framework was not fully tested, it is envisioned that it could be used within HealthCo to further enhance learning activities through dialogue and language development.	<p>9. Modelling and other communication techniques, based on the principle of systems thinking, allows participants to question and alter their thinking about issues relating to an ISA project. Participants however, need to either undertake the investigation or be able to access any data, so this process can be achieved.</p> <p>10. The SSM<sup>XLTM</sup> framework could add value to a project that is in essence structured with an ISA having already been identified and selected. This value however, may only represent enhancing the dialogue and language development by discussing how the processes should be undertaken. It however is still valuable and is essential for IS projects.</p>

Table 9.2

*The Learning Points Drawn from the HealthCo Case*



Whilst an attempt has been made to draw out the benefits of using the early phases of SSM<sup>XLTM</sup>, the latter phases have only been addressed theoretically. This has been the main limitation of this case, as the BreathCo case identified and justified the development of SSM<sup>XLTM</sup> through the data. The HealthCo case was identified in order to re-test the framework. It is argued that this case has been useful and lessons have been learnt. The final section of this chapter discusses issues that this research has addressed, particularly in the two chosen cases, before going on to draw a number of conclusions in chapter ten.

#### 9.4 Discussion

This aim of this work set out to investigate how a learning approach can be incorporated into soft methodologies for the design and implementation of information system applications (ISA)? Grant and Ngwenyama (2003) state an evaluation is rarely undertaken of any developed information systems methodology. This may be because there is no agreement as how best to undertake this evaluation process (Grant and Ngwenyama, 2003). Whilst the approach (SSM<sup>XLTM</sup>) is argued as a framework as opposed to a methodology, an evaluation still needs to be undertaken. This will now be the focus of this discussion. The theory used was the expansion of Soft Systems Methodology (SSM), combined with work of the learning organization to try and embed and create learning. An attempt was then made to apply this theory in practice, within two organisations. The SSM<sup>XL</sup> framework (which became the SSM<sup>XLTM</sup> framework), was designed to be used in a participatory and co-operative mode, which included the individuals of both organisations being involved in the research process. The problem was that in the BreathCo case, the project adopted a very large aspect of participant led work, which could be classified as drifting away from the developed and declared methodology. In the second case, the participants were happy to participate, but did not want to be co-opted in to the research process. Whilst both cases attempted to use the SSM<sup>XL</sup> framework (the exploration and modelling aspects of the SSM<sup>XLTM</sup> framework), both cases presented a number of issues that need to be discussed. Whilst these issues may be considered problematical when using SSM<sup>XLTM</sup> in practice, they do provide learning opportunities to the participants of both cases, the SSM<sup>XLTM</sup> framework as an area of research, and the researcher. As a start to this discussion, a focus on the methodology used will be undertaken.

**9.4.1 Issues Encountered through the Methodology Developed**

The problem that Checkland and Scholes (1990) highlight with earlier users of SSM relates to the stream of cultural inquiry that once undertaken was forgotten about, especially when it came to making the feasible and desirable changes. The devised methodology went some way to address the issues that Checkland and Scholes (1990) discuss as being an important aspect of 'mode 2' (as a way to think about problem situations) SSM use. Encouraging the participants to become more engaged in the research process would decrease the chances of another individual, unethically or unintentionally, advocating changes that would leave the participants at the research sites in a difficult position. The problem is that advocating unethical changes, even unintentionally, and recording the outcomes would contribute to knowledge. This is why a formal action research strategy was not used, which many users of traditional 'mode 1' SSM (a methodology to follow) apply. As highlighted through the research and the table constructed by Heron (1999), the participants, as co-researchers and co-subjects sometimes drifted from the state of co-operative inquiry (CI). It could be argued during some parts of the research, the methodology operated in more of a participative action research (PAR) perspective, whilst at others, it represented more co-operative inquiry. Whilst this is accepted to some extent, it is stated that participatory action research provided the method to undertake the research, with co-operative inquiry providing the structure. Whilst the two approaches may be identified separately within aspects of the research, it is argued that this is not necessarily a bad thing. Figure 9.4 has been constructed to contemplate this issue.

Whilst focus could move backwards and forwards from participatory action research to co-operative inquiry (see Figure 9.4) throughout both projects, it is argued this was a suitable way to conduct research 'with' participants within the research domain. As Heron and Reason (2001) argue as needing to be undertaken, it was not possible to fully discuss co-operative inquiry as an approach to conducting research. Heron and Reason (2001) continue by adding that the issue of co-operative inquiry is down to the individual and how they bring the issue up. They are quite right. This may have been down to the inexperience of the researcher and not wanting to force the participants to adopt a method they were not interested in. The emphasis of co-operative inquiry was attempted within the research, even if all four phases of co-operative inquiry were used informally and no record of the number of cycles was made.

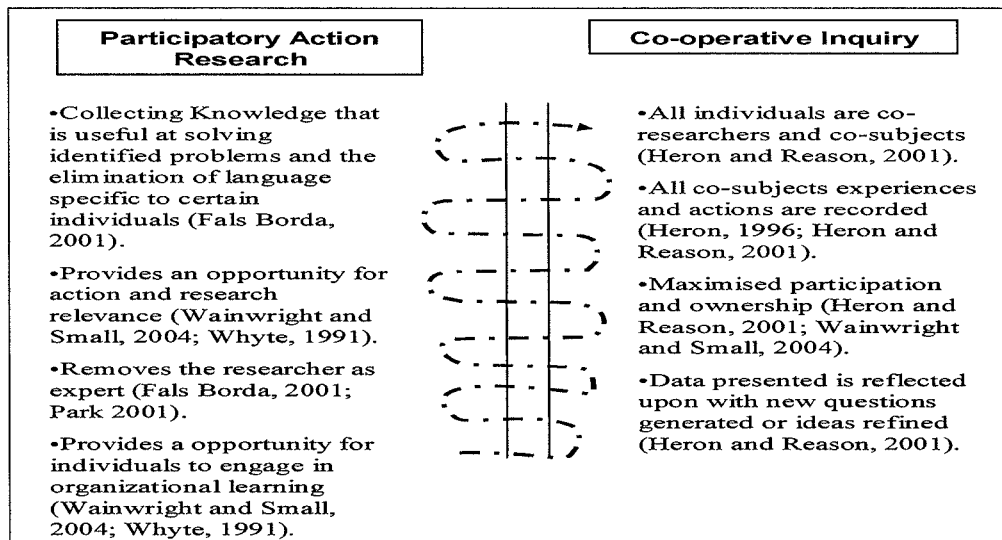


Figure 9.4  
*Adoption of the PAR and CI Flux*

Figure 9.4 demonstrates the advantages of both PAR and CI approaches, as drawn out within chapter five. The dotted arrow tries to reflect the interweaving nature of the research process from participatory action research to co-operative inquiry, as the researcher and the participants became co-researchers and co-subjects for particular issues, but at other times, participants required help in undertaking processes and using specific tools. This is especially important in remembering why formal SSM modelling approaches were not undertaken. Issues arising from this included firstly, the co-researcher, and co-subject perspective would not allow participants to be forced to use formal root definitions and conceptual models on other participants. Secondly, when co-researchers and co-subjects moved to a more participatory action research stand point, participants did not want to collect and reflect on the data available. As the participants were encouraged to be co-researchers as well as the researcher being a co-subject, all data was offered to participants to comment upon along with all reports written. Trying to emphasise more co-researcher aspects could be declared un-ethical. The adopted methodology had to take all of these issues into consideration. All data was made available to all participants in an attempt to allow joint ownership and so that the data was not restricted to the use of a few individuals. It should be noted, all data has been disguised to protect the participants and the organisations themselves, even though within both projects participants were happy to be named. Whilst the methodology was found useful, it could be considered that if

SSM<sup>XLTM</sup> is to be fully re-tested, a formal action research methodology may need to be used. This then becomes an ethical dilemma for future research.

#### 9.4.2 Exploring Issues with the SSM<sup>XLTM</sup> Framework

The fully developed SSM<sup>XLTM</sup> framework was designed to be used by participants in the problem situation. In both cases, the two frameworks (the SSM<sup>XL</sup> framework and the SSM<sup>XLTM</sup> framework) were used in more of a 'mode 2' approach (see Checkland and Scholes, 1990). This can be seen by using SSM<sup>XLTM</sup> as a way to think about the problem situation, compared to actually using the framework in sequence with the participants in more of a 'mode 1' perspective. The problem was that in both cases the frameworks (SSM<sup>XL</sup> and SSM<sup>XLTM</sup>) were not made explicit, due to the many time issues that were placed on individuals. Along with this point, participants also stated they would prefer to continue by using thinking from the researcher, as well as other familiar tools and approaches (e.g., GREAT, PRINCE and the associated tools and documentation). To force this issue would invalidate the methodology designed to stop such issues. Whilst the frameworks were not revealed, they took a similar approach to that Checkland and Scholes (1990) adopted in one of their projects. Checkland and Scholes (1990) decided not to reveal the SSM approach to the participants. It is argued that in the BreathCo case SSM<sup>XL</sup> tried to produce learning organization theories within the framework. The problem was that both SSM and the learning organization thinking in this research, remained on the tacit level. The same could be said with trying to use SSM<sup>XLTM</sup> in the HealthCo case. Because of the tacitness within each project firstly, there may be a gap between the success in undertaking the enhancement of learning capabilities through IS implementation. Secondly, leaving the research sites with a SSM<sup>XLTM</sup> framework participant's can use to undertake this task in future projects.

Some of the issues discussed so far, were reviewed within the BreathCo case to take account of the advantages and limitations of SSM<sup>XL</sup>. For example, the use of the co-operative approach was stated to let the research drift between both of the frameworks, as it was not made explicit due to the time requirements in undertaking aspects of the SSM<sup>XL</sup> framework (BreathCo) and the SSM<sup>XLTM</sup> framework (HealthCo). Whilst this was the participants' of BreathCo's choice, as well as allowing the exploration phases and modelling to take as long as they did, senior management

issued a directive for implementation. The project therefore, had to speed up, and issues could have been missed, especially as the participants did not have the particular framework to use to help them complete the later phases. This point may relate to the next. Participants were noted to like using processes they are used to. In BreathCo, this was the GREAT process. The tools and techniques adopted (e.g., rich pictures, AIM, flow charting) were used as they were considered as being commensurable with GREAT. The process of AIM and developing rich pictures may now be used in future projects, as participants found value in using them. At the HealthCo case, this included flow charting and processes contained within the PRINCE methodology.

The review of data and interpretations drawn from BreathCo, SSM<sup>XLTM</sup> needs to be made explicit in order to see how the framework can be used for a second case. How respondents who may not be aware of SSM, perceive and use it will have to be recorded as well as how this research has tried to build on this work and the resultant SSM<sup>XLTM</sup> framework. For example, how the modelling phases would be undertaken, either formally as SSM states, or in a more familiar approach similar to that BreathCo would adopt, needs to be explored. Whilst SSM<sup>XLTM</sup> was revealed to the project leader of HealthCo, he was primarily interested in using SSM<sup>XLTM</sup> to structure the problem situation in a 'mode 2' perspective. This therefore, did not allow SSM<sup>XLTM</sup> to be made explicit and did not address one of the issues drawn out from the BreathCo case.

One of the limitations of SSM<sup>XL</sup> in the BreathCo case was the participatory and co-operative approach. This limitation was addressed through the project leader of HealthCo, by emphasising a participative approach. As the researcher had knowledge and an understanding of the developed SSM<sup>XLTM</sup> framework, the project moved forward more quickly. With less emphasis on the co-operative elements, important aspects of the data and other issues may have been missed. There seems to be a trade off between using SSM<sup>XLTM</sup> to try and develop learning activities, using an action research approach, the way Checkland and Scholes (1990) designed, and the participatory and co-operative aspects designed to help participants take control of the research, developing models, and undertaking processes they are confident and familiar with.

It is argued that when SSM<sup>XL™</sup> is used again, the process has to be made explicit before any project is undertaken, so all participants can understand what the learning framework is designed to do, and how SSM<sup>XL™</sup> can be used. A form of workshop may be required, where participants wishing to use SSM<sup>XL™</sup> can attend. Undertaking such a workshop may leave participants perceiving the approach as complex, or too time consuming. This limitation may not be solved. This is also similar to teaching participants how to construct root definitions, CATWOE, and conceptual models. This limitation was identified in both cases, due to the co-operative aspects within BreathCo and the participative aspects of HealthCo.

One solution to the limitation of perceiving the framework as complex, or too time consuming, comes from West (1995) and her development of the Appreciative Inquiry Method (AIM). Whilst the Venn diagrams were adopted as a tool to try and structure problem situations (even though it was unsuccessful at HealthCo), the tool was used to compliment the rich pictures. Whilst West (1995) states AIM was designed to elicit knowledge, West, Stansfield and Stowell (1994) admit that the approach is useful for more than just this. If participants are unable to construct formal root definitions, CATWOE's, and conceptual models, other knowledgeable individuals could do this on their behalf, by undertaking the AIM approach (e.g., a researcher or consultant). This could then justify a further participative and co-operative approach to naming relevant systems and model building. The remainder of SSM<sup>XL™</sup> could be worked through as normal, with participants taking control of the research process and hopefully generating learning activities and developing learning organization thinking which the learning framework tries to emphasise. This can be achieved through dialogue about the activities under discussion, and creating a shared language which could allow double-loop learning (cf. Argyris and Schön, 1978, 1996) and Senge's (1990) learning organization conditions, to be used to achieve conditions of learning. This will now be explored.

It is hoped learning organization conditions are used throughout the learning framework. It is believed however, that if they are to add value the latest they should begin is through the modelling phases, which can develop personal mastery, team learning, create a shared vision, and question current mental models. Double-loop learning (cf. Argyris and Schön, 1978, 1996) may be achieved through these issues,

the questioning process, and investigating the underlying issue of why a participant believes certain characteristics are important. Undertaking such a process can create a more suitable dialogue, and the development of a shared language relating to how best to tackle the problem situation, especially if ISA are required. The limitation of participants only using processes they are used to using could be overcome if participants can construct root definitions, CATWOE's and conceptual models, or another individual is undertaking this process on behalf of participants. As Stowell (2000) states when discussing AIM as an approach to client led design, the analyst gets participants to explain the processes they have stated within their diagram through approaches such as semi-structured interviews, in an attempt to also extract a suitable CATWOE. From the Venn diagram and extracted CATWOE, the analyst then constructs suitable root definitions (Stowell, 2000). Whilst this approach may overcome the previous limitation, and the limitation relating to time, the limitation of participants having nobody to ask questions of or seek guidance from in using the SSM<sup>XL™</sup> framework still remains. This was drawn out in the BreathCo case, as dependence on an expert or other consultants may still be necessary, especially in understanding the learning organization thinking that was adopted. This limitation is important. The only suggestion to overcome this is to develop a formal work book that participants can use. Trying to incorporate the learning organizational thinking could still be difficult to explain, as would how to use it, or how to interpret the theory. A reliance may be required on a consultant, for example until such issues are fully understood, if they ever are.

Another tool used to try and enact systems thinking which needs to be briefly discussed is the IDEF0 software. The IDEF0 software attempted to take a systems perspective to a problem situation, that participants could reuse in other projects if found useful. As the participants of the HealthCo case stated they could undertake a similar process in the future, the tool could be added to the tool box of techniques and modelling processes, that could be used to try and explore problems in systems terms. This compliments the participants of BreathCo when stating the processes of rich pictures and the AIM Venn diagrams as being simple to use and adding value in soliciting other participant's perspective. These approaches could be added to the approaches that SSM<sup>XL™</sup> can utilise in drawing out and structuring problem situations, in addition to trying to develop theories of the learning organization and

organizational learning. If these processes are undertaken, it should enable a more focused approach to implementing an ISA, if this is the decision that a project team want to take.

Comparing what was modelled to what was undertaken at phase 2 of the SSM<sup>XLTM</sup> framework, will allow the development of a language that leads to making desirable changes. This phase may alert the project team that an ISA is required. Action then has to be taken to implement and manage an ISA. This action has been considered to begin with identifying the most applicable ISA. The final phases (8-12) need to be used in practice. It was hoped this would be possible in the HealthCo case, but due to the nature of the project and the projects suspension, this was not possible. In spite of this limitation, further lessons on how successful such an approach would be, were derived from the participants at HealthCo. On analysing the data, it was found that HealthCo do undertake such approaches, even though they do not acknowledge ISAEP processes as part of IS implementation and management. How the envisioned learning organization conditions would be undertaken, has still not fully been explored, as the practical work at BreathCo and HealthCo used data collected to investigate the usefulness of the second part of SSM<sup>XLTM</sup>. For example, with a change in philosophy from the softer more exploration phases, to the harder more structured processes of IS implementation, it is unknown how with the distraction of an ISA, would participants further develop the learning organization conditions.

The SSM<sup>XLTM</sup> framework has been designed to draw together a variety of techniques that participants can use to jointly identify, select, acquire, exploit, and protect ISA. These are the base level issues which need to be undertaken, with the more technical data structuring and programming aspects of an ISA project being completed at a lower level. Whilst these technical issues are being addressed, participants have to focus on how ISAEP processes will be undertaken. Communication becomes very important therefore, it is essential the dialogue and shared language that has been created is used within these processes. If dialogue is maintained within these more structured processes, the learning organization conditions, as developed by Senge (1990), can be undertaken, with double-loop learning also being used. If a particular phase becomes problematical, SSM<sup>XL</sup> can be used as a framework to explore the problems the team are experiencing. This is the advantage of SSM<sup>XLTM</sup> but it was not



possible to re-test this. In an attempt to overcome this limitation, the complete SSM<sup>XLTM</sup> framework was taken back to BreathCo and formally presented to the EDP manager. The purpose of this was to obtain the EDP manager's opinion on the approach, as a means to evaluate the SSM<sup>XLTM</sup> framework.

#### 9.4.3 Evaluation of the SSM<sup>XLTM</sup> Framework

It was decided in the analysis of both projects, that the full SSM<sup>XLTM</sup> framework should receive some form of evaluation. As SSM<sup>XLTM</sup> attempts to embed a learning approach for the design, implementation, and management of ISA, it was decided that the evaluation should come from an IS specialist. The purpose of such an evaluation was firstly, to get comments on how SSM<sup>XLTM</sup> can be used in future projects. Secondly, SSM<sup>XLTM</sup> needs to be used with participants who may not be IS designers and developers, but who need to be involved in the process. Due to this thinking, the EDP manager from BreathCo was contacted to see if he would be willing to give his opinion on the SSM<sup>XLTM</sup> framework. The EDP manager was happy to give his opinion, so a meeting was set up in December 2005. Whilst not a formal interview, an overview of the SSM<sup>XLTM</sup> framework was given whilst the EDP manager added his comments where applicable. The comments were recorded in a similar manner to the interviews conducted throughout the research, but this particular interview was not formally transcribed. The main issues the EDP manager concluded based on the work presented are stated as:

- Participants just want an end result, even though they may not know what they want.
- As the implementation of an ISA progresses more features are requested. More features are also sometimes requested once an ISA has been implemented.
- Following on from the previous point, it is stated that in order to avoid such complications the right questions need to be asked. However, unless face-to-face meetings are undertaken, requests through applications such as e-mail are easily forgotten about.
- Participants are not interested in undertaking modelling and other processes that can create dialogue, even though these are important. This is due to issues such as lack of time, laziness, and the culture of the organisation, even though

the SSM<sup>XLTM</sup> framework is easy to follow and does not add to bureaucracy, which other information system development (ISD) approaches attract.

- Whilst formalising the tacit issues is important, the process will cause longer lead times.
- All projects have to follow the same process therefore, the use of SSM<sup>XLTM</sup> for a very small application is impractical.
- Designing a work book that contains the tools and techniques for using the SSM<sup>XLTM</sup> framework is a good idea.
- The SSM<sup>XLTM</sup> framework can be perceived as too much work to undertake in reality at BreathCo.

The EDP manager states on the whole SSM<sup>XLTM</sup> is very good, as it allows a project team to investigate different aspects within an IS project, as well as manage the process. The main problem he argues, relates to the individuals that make up BreathCo. The EDP manager highlights the problems he has been faced with other projects that require such ISA. These individuals just want an ISA and are not interested in undertaking the processes that SSM<sup>XLTM</sup> requires to investigate different alternatives, and undertake modelling processes, before identifying an ISA. It is left to the EDP manager and his team to try and ask the right questions. This has to be undertaken personally, as participants may ignore such requests through e-mail. In comparison, face-to-face interaction was argued as being necessary in exploring the learning theories, even though the EDP manager may not be interested in such issues. This was stated as a cultural aspect within BreathCo, even though the data uncovered the time pressures certain participants are under.

It may be stated that the EDP department are forced to undertake a more objectivist systems life cycle approach, due to participants not wanting to get involved, as opposed to these participants not being allowed to get involved. A more structured approach to IS implementation is undertaken. Using this thinking, it can be proffered that the developed SSM<sup>XLTM</sup> framework which tries to enact learning organization thinking, may require BreathCo to show characteristics of learning organizations, as a result of cultural issues! The problem just highlighted remains a limitation of the approach due to firstly, having to make SSM<sup>XLTM</sup> explicit to participants and secondly,

using the SSM<sup>XLTM</sup> framework the way it was designed to be used. Whilst these were the opinions of one participant who saw the full SSM<sup>XLTM</sup> framework, it may not be the thinking of others, and value could be gained by individuals within other organisations.

Whilst the issues discussed here uncovered through the EDP manager, provided both advantages and limitations for future projects, SSM<sup>XLTM</sup> was used as a way to structure both of the projects (cf. Checkland and Scholes, 1990). This could be argued as the main limitation of the study. It is argued through the developed methodology and the planned and described research approach, this is not so. The SSM<sup>XLTM</sup> developed framework can be described as having been designed for 'mode 1' use with participants, but it is hoped it can be used more flexibly in the future (cf. Checkland and Scholes, 1990), by moving to more 'mode 2' thinking. Checkland and Scholes (1990) describe 'mode 1' users of SSM as using systems ideas as the framework, with the methodology being the application of SSM. In comparison, 'mode 2' thinking uses SSM as the framework of ideas, with the methodology being the reflections on the use of the approach and the ideas brought to the area of application (cf. Checkland and Scholes, 1990). The outcome of such an approach allows learning to be generated (Checkland and Scholes, 1990). Holding true to the writings of Checkland and Scholes (1990), it can be stated that through the development of SSM<sup>XL</sup>, and the joining of the technology management process framework (TMPF), the research contained both elements of 'mode 1' and 'mode 2' approaches.

The SSM<sup>XLTM</sup> framework was designed to be used by participants of the problem situation until the desired result being a designed and implemented ISA which needs to be managed. A problem could be caused by the title of such an approach, through developing 'SSM<sup>XL</sup>', and then when it was joined with the technology management process framework (TMPF), the approach became 'SSM<sup>XLTM</sup>'. Whilst the SSM<sup>XLTM</sup> framework is implied as 'complete' or 'full', this can be criticised as implying that the SSM<sup>XLTM</sup> framework encompasses everything required to design, implement, and manage an ISA. This is firstly put down to a bad use of language. Secondly, a more suitable name could be found for the SSM<sup>XLTM</sup> framework. The problem comes from trying to use the advantages that SSM offers, whilst also trying to enact the learning organization thinking argued as being an advantage. Formal SSM approaches of root

definitions and conceptual models may not be used if participants do not wish or are unable to do so. These however, are key processes of SSM. Their exclusion could cause questions, as no similarities are held to SSM as developed by Checkland (1993) and Checkland and Scholes (1990) when discussing the constitutive rules and the epistemology of SSM. This issue will be addressed in the final section of this chapter. Before this is undertaken the difficult nature of learning needs to be reiterated, as does how can it be seen and identified, especially in the arena of an organisation. The next section will discuss such matters before this chapter concludes with some final thoughts about the SSM<sup>XLTM</sup> developed framework.

#### **9.4.4 The Measurement of Learning Activities**

As has been pointed out in the literature review, identifying precisely where learning has occurred is a difficult task. The work of Argyris and Schön (1996) called for the measurement of learning as it is believed where learning has taken place can then be identified. Unfortunately it was not possible to undertake the measurement within this research. A tool however, has been identified that may help chart and measure learning. This tool goes by the name of DISCOUNT (see Pilkington, 1999). When Pilkington (1999) refers to DISCOUNT, she is not referring to a qualitative software programme such as ATLAS.ti, but to an overall scheme that requires use by an individual, or group of individuals, to mark up conversations, interviews, or any other method of recorded interactions between two or more people using language. It is not practical to go in to great depth on how the DISCOUNT scheme has been comprised. Readers can therefore find information on: transactional analysis and exchange structure; logical dialogue games and rhetorical structure theory within Pilkington's (1999) technical report. Having read and learned about the DISCOUNT scheme (see Pilkington, 1999), it was identified as one possible tool which could be expanded to try and identify learning organization conditions in practice. Whilst an attempt was made in a paper by Small and Irvine (2006) to expand and use the scheme in practice, the results were unfortunately limited, due to the discourse that was captured, and as a consequence, this has not been discussed in this research. However, what can be discussed here is what was attempted as part of the action research cases.

Access to a number of e-mails relating to the customer concerns management (CCM) project at BreathCo was obtained. The problem was that the interchange was not

suitable for use of the expanded DISCOUNT scheme. Whilst the scheme and the expansions may be confusing, the examples serve the purpose of explaining why the scheme was judged to be limited and the problems faced. For example, from the e-mails that were obtained, issues with the ISA were under discussion and not projects that could be undertaken to improve the organisation, or generate further learning activities. The following is an example of an e-mail from the 2<sup>nd</sup> customer services team leader to a member of the EDP department to discuss a problem with the concerns technology.

*(\*2<sup>nd</sup> Customer Services Team Leader\*) {{\*Initiating\*}} {\*Open\*} {\*Reason\*}  
\*Problem\**

Hi \*\*\* (EDP Employee), \*\*\* (another employee) forwarded responsibility to me, then I needed feedback from \*\*\* (another employee), I sent to him. He cannot link to complaint or open on his laptop.

*(\*2<sup>nd</sup> Customer Services Team Leader\*) {\*Metastatement\*} \*Task\* \*QProblem\**  
Is this problem being looked at?

The first part of the above example tries to demonstrate that the 2<sup>nd</sup> customer services team leader is opening a dialogue proposing a problem with the concerns technology with an EDP employee. The second part shows the 2<sup>nd</sup> customer services team leader making reference to the problem and asking if the problem is being dealt with. As can be seen, the processes identified were developed by Pilkington (1999) in her scheme with the additions developed by Small and Irvine (2006) to look at learning organization conditions cannot be identified. The second problem is that the communication is one way to the EDP employee over a concern issue. It was not possible to capture follow up dialogue. The EDP employee may have responded by e-mail, by phone, or in person to the 2<sup>nd</sup> customer services team leader. Other examples were also constructed using the transcripts of the interviews with the project team and the participants who used or did not currently use the ISA. Below is an example from the interview transcript with the research and design employee at BreathCo, in connection with good aspects of the concerns technology.

*(\*Researcher\*) {{\*Initiating\*}} {\*Metastatement\*}*

Erm, can you talk about any,

*[[\*Probe]] \*Task\**

you mentioned there some good points, but any other good points?

*(\*Research and Design Employee\*) {{\*Responding\*}} {\*Reply\*}*

Err, I think the good points about the training was

*[[\*Reason\*]] [[\*Support\*]]*

the fact that the software, the tracking software is there

*[[\*Monitor\*]] \*Instrument\* \*Customer Focus\* \*Goal\**

and, err, accountability to make sure the customer gets some feedback with in an agreed period of five days or whatever it is.

*(\*Researcher\*) [[\*Probe\*]]*

Did the technology look user friendly?

*(\*Research and Design Employee\*) {{\*Responding\*}} {\*Reason\*}*

It did but I'm used to working on CAD systems.

*[[\*Support\*]] \*Contrast\**

I'm used to working with Lotus notes, err, I guess someone not as CAD literate would struggle with it

*[[\*Support\*]]*

but, err, from a personal point of view I had no problem.

Whilst the expanded DISCOUNT scheme has been applied to the transcript, dialogue is between the researcher and a participant in an interview environment, as opposed to the working environment of an organisation. Whilst certain learning organization conditions have been identified (e.g., goal and support) as argued in the paper by Small and Irvine (2006), they are only instances of the categories, which can relate to

the critical success factors argued as being important for learning organization conditions (see Small and Irvine, 2006 for a description of DISCOUNT and how the expansion was undertaken). For example, it is unknown whether the research and design employee is showing characteristics of defining a gap between the current state and the desired state, or undertaking an inquiry and reflection process as both factors contain the category 'support'.

This brief, if not confusing analysis, demonstrates that firstly, more appropriate dialogue needed to be captured. Secondly, whilst this attempt proved limited there is no reason why the additions to Pilkington's (1999) DISCOUNT scheme cannot be refined and used in the future. This could be one aspect of any future research.

#### 9.4.5 Final Thoughts about the SSM<sup>XLTM</sup> Framework Developed

The SSM<sup>XLTM</sup> framework was designed so that it could be used in sequence from beginning to end in a more of a 'mode 1' approach. The SSM<sup>XLTM</sup> framework was also designed as an approach that could be used more flexibly. For example, the first part of SSM<sup>XLTM</sup> can be used as a way to investigate a problem situation that involves designing and implementing an ISA. The second aspect of SSM<sup>XLTM</sup> allows an ISA to be implemented and managed and can be used more like a formal methodology. If participants are finding phases of the second part of SSM<sup>XLTM</sup> difficult, SSM<sup>XL</sup> could be used to help, thus building recursive aspects into the approach. Finally, the developed SSM<sup>XLTM</sup> framework could be used as a way to think about problem situations that may require an ISA, as well as how to manage the ISA. It is important to remember that the framework is trying to generate learning activities through use of the approach. It is argued that whatever the approach is to be used, the tools can be used to help participants create learning opportunities.

This SSM<sup>XLTM</sup> framework is made different to formal SSM due to the approach being used for IS projects. Traditional SSM proposes investigating problem situations and constructing models that will satisfy root definitions, derived from investigating the problem situation. The constructed models do not take account of IS issues specifically. This researcher has attempted to adopt the principles of SSM for helping participants in designing an IS. This could be why the modelling undertaken in BreathCo favoured more flow modelling processes compared with conceptual models,

even though conceptual models were used in HealthCo, but this was a personal choice. By not having the time to explain SSM modelling processes within BreathCo, how these participants would use or explore this approach was unknown. It should be remembered that one of the reasons SSM was argued for as being useful for this work, related to the systems thinking the approach incorporates. Whilst Checkland (1993) and Checkland and Scholes (1990) have derived techniques for using soft systems thinking, it can be argued that these are not the only way to think in soft systems terms. As long as participants are able to think using soft systems thinking, through the principles discussed within chapter two, other modelling approaches that draws this out could also be used. Participants may not appreciate that thinking in this way is practical, which is why they may use other approaches no matter how simple or clearly soft systems thinking is presented. What is clear is that SSM<sup>XLTM</sup> is similar to SSM in that the framework is an 'ideal' type (e.g., Atkinson, 1986) for designing, implementing and managing an ISA. Variations therefore could be used in practice.

Whilst the points discussed above are relevant, they have been drawn out from this research but also need to be taken into account in any future research. At BreathCo SSM<sup>XL</sup> which was developed within the literature, was applied in practice with the outcomes being recorded as the first cycle of action research. In the second cycle of action research, holding to the methodology adopted, the processes BreathCo used to implement the ISA, and how it built on the earlier work was recorded. The SSM<sup>XLTM</sup> framework was developed through the analysis of the data from the BreathCo case, followed by reflection on the literature. An attempt was then made to apply SSM<sup>XLTM</sup> within a second case. Whilst SSM<sup>XLTM</sup> could not be re-tested for the reasons stated, the issues remained the same, in that participants were not interested in learning about using SSM<sup>XLTM</sup>, the language of SSM, or the attempt to enact learning organization thinking, and the benefits this could bring. In the main, it was the researcher who used SSM<sup>XLTM</sup> to think about problem situations and communicate the findings at various phases of the project back to the participants involved. This is why West's (see West, 1995; West, Stansfield and Stowell, 1994) work is argued to hold value. Whilst the language of root definitions, CATWOE's, and conceptual modelling may be confusing to participants, they can be discussed through the work produced. This would also allow the speeding up of the modelling phases, giving participants more time to undertake other activities either on the project, or as part of their roles within



organisations (e.g., participants at BreathCo and HealthCo). At the same time as giving participants this advantage, the processes may become clearer and be used in future projects instead of the participants being scared of the approach and never attempting to use it again. What can be drawn from this discussion and the practical work undertaken for the purpose of this research will be concluded in the next chapter.

## Chapter Ten: Conclusions

### 10.0 Reflecting Back on the Problem Situation

The researcher set out to explore the continuing problem of failing to learn from information system application (ISA) design and implementation experiences. While failure could be seen as the end product of an information systems (IS) project, it was the issues and processes that contributed to making a particular IS project a failure and how learning could be embedded into an ISA project that was of particular interest. Lyytinen and Robey (1999) state that one aspect of a failed ISA project comes from individuals within organisations failing to learn from information systems development (ISD) projects due the lack of encouragement individuals receive, the way organisations are designed, and other issues associated with education. It was with this aspect of 'learning' that particular emphasis was placed with relation to IS design and implementation projects.

In order to try and address this issue of embedding learning within an ISA implementation project, an approach or framework was deemed to be necessary. While this selection of a framework or approach could be seen to be straightforward, different frameworks or methodologies have been designed to tackle particular issues based on different philosophical stand points. To try and address this lack of learning through a methodology or framework, the philosophies of IS design and implementation projects as well as learning needed to be taken into account. Through declaring a research approach on how this work should be conducted, it should be pointed out the epistemological issues that were discussed. Through undertaking such a discussion, a more constructionist approach was adopted which directly linked to what framework or methodology could be used, or developed, to take account of how learning can be embedded within an information systems development (ISD) project. This philosophical perspective also relates to how learning is believed to occur. A more objective approach to IS implementation and how learning is believed to occur was deemed not suitable for this work. The research question of 'how can a learning approach be incorporated into soft methodologies for the design and implementation of information systems applications (ISA)' was posed as one way to tackle this issue of failing to learn through ISD projects.

The theories critically reviewed to address the research question came from the IS literature with particular attention to how IS are designed and implemented and from the learning organization with focus being placed on the 'learning' aspect. Starting with the IS literature, it was drawn out that managers and other individuals may not have a clear understanding of the term 'IS' (Information Systems) or 'IT' (Information Technology) for example. Systems thinking was posed as one attempt to tackle such issues; however, within the area of systems thinking there lays both hard and soft approaches. Due to the epistemological debates undertaken, soft systems thinking was considered to be useful for this work and as a result, a framework or methodology that incorporated such thinking was sought. Through exploring ISD methodologies, three approaches were identified as potentially useful. While all three methodologies were identified as useful, the work of Kolb (1984) was used to compare any elements of learning that each methodology already contained within it. Through undertaking such a review, Soft Systems Methodology (SSM) was identified to provide learning capabilities as well as incorporating aspects of soft systems thinking. Soft Systems Methodology's strength comes from focusing on problem situations, human behaviour and taking purposeful action. In the past SSM has been used for IS projects with varying degrees of success. It was the researchers aim to expand this soft methodology with further emphasis being placed on embedding the learning and use it on an IS project. In order to explore the issue of learning, a second body of knowledge was used.

The second body of literature that was explored attempted to further enhance and embed the learning capabilities of SSM. This literature came from the learning organization (LO). The learning organization was used to investigate the concept of learning within an organisation and learning as an individual experience. What was drawn out from this work was that the learning organization discipline can be broken down into building a learning organization or undertaking organizational learning. The problem faced was that this literature is complex, sometimes ambiguous, and difficult to apply in practice. What was taken from this body of work was the potential to undertake double-loop learning (see Argyris and Schön, 1978, 1996) and Senge's (1990) five disciplines to building a learning organization. While both these theories are interesting, it was pointed out the requirement of dialogue and language development for undertaking learning organization theories as well as SSM itself.

The aim of the learning organization literature was to use the ‘learning’ aspect the field promotes. The problem and contradiction of this body of work was that learning is never really discussed at the level of the individual. As an attempt to address this problem, theories of learning were sought focusing on the social aspect that is believed to be how learning is undertaken. For that reason, *determining what theories of learning and information systems development can be applied to learning in organisations* a critical review of the literature was undertaken. The outcome of the review defined Bandura’s (1977) social learning theory, Vygotsky’s (1978) zone of proximal development (ZPD) and Lave and Wenger’s (1991), and Wenger’s (1998) communities of practice (COP) as key theories of learning that are directly relevant to ISD. Communities of practice (COPs) is seen as a popular theory within the learning organization field. Other researchers though, are starting to be aware of the social aspect of learning (see Kilgore, 1999; Lines, 2005; Mavin and Cavaleri, 2004). These theories were also argued to have been identified within the action research cases even if there is no purely scientific method to prove this conclusively. From conducting this research and the analysis undertaken, it is stated these theories can be applied to learning in an organisation.

Through undertaking this research, it is concluded that development theories promote participation as an important factor that is required to achieve learning in organisations. To support this perspective, authors such as Mumford (1995, 1996, 1997) and Stowell and West (1994) also argue that participation is required to successfully design ISA. This was also found from using the SSM<sup>XLTM</sup> framework in this study. It is argued this participation with IS implementation can aid the learning of individuals within organisations.

Participation is not lost on the field of the learning organization and is stated as the key in undertaking organizational learning and other theories for designing ISA. *How these theories were identified and can be applied to information systems development* came firstly through the primary research at BreathCo. Through the different stages of the project at BreathCo, all three theories are argued to have been identified. When the project was initiated, individuals were asked to participate. This brought people together to work on issues associated with the project. Throughout the different stages of the project, it is argued individuals moved around the community while new participants (e.g., the IS specialist and the IT manager) joined and other participants left. While participants could be identified as being part of the community they provided different skills and knowledge

through their jobs, their perspectives of the proposed problem, and any proposed ISA, and the effect it could have within BreathCo. Through Vygotsky's (1978) zone of proximal development (ZPD), this knowledge can be transferred to other individuals within the community as long as the social aspect of participants being exposed to each other is taken into consideration. This transfer is argued to be aided through using SSM<sup>XLTM</sup>. Through using Bandura's work (1977) and the way the individuals of BreathCo undertook the concerns project, the group meetings could help or hinder the participation required. Inquiring into the processes that make up the model of triadic reciprocity could allow corrections to be made to how a project is undertaken allowing greater participation if it is believed as being required. Further evidence was drawn out from the HealthCo case with the project leader and other participants who were happy to participate in the project but did not want to be co-opted into the research process. This was believed to limit the advantages of using SSM<sup>XLTM</sup> and the learning that the framework has embedded within it, as well as allowing a second case to try and identify such theories in practice. It is considered that all three theories can relate to the design and implementation of ISA through the social aspect they promote by investigating ISD projects in this way and the amount of participation and co-operative inquiry that can be achieved.

### 10.1 The Impact of Developing a SSM<sup>XLTM</sup> Framework on Theory and Practice

By critically exploring the three bodies of literature (IS design and implementation, the learning organization and three learning theories), it was possible to develop a soft framework *to develop and evaluate the use of a learning process for effective design and implementation of information system applications*. This objective was achieved by developing a SSM<sup>XLTM</sup> (Soft Systems Methodology eXpanded for Learning incorporating Technology Management) framework. While different methodologies have been developed to take account of different aspects in an ISD project, each can encompass a different perspective or focus on specific issues. How participants can generate learning processes with an adapted methodology for effective design and implementation, requires individuals who will be affected by any such project to participate and be involved. With a number of participants coming together they will each hold various mental models about what an IS project will need to address. These different interpretations need to be explored and communicated. Techniques and tools can be used for this purpose, for example, the Appreciative Inquiry Method's Venn diagrams (see West, 1995) and rich pictures (see Checkland and Scholes, 1990) were used in this study; while participants of BreathCo liked

to use tools from GREAT and the participants of HealthCo used tools from PRINCE. The SSM<sup>XLTM</sup> framework designed can be worked through either, as a way to think about an ISD project or as a formal framework. The advantage of such a framework is to generate learning through providing a place where exploration of problems can take place and the learning theories argued for can have an impact. A formal methodology may not take the time to explore different perspectives or allow the construction of models that can be dialogued. The SSM<sup>XLTM</sup> framework consequently promotes the use and development of systems models. These models may not be formal root definitions and conceptual models, but could include modelling processes as stated by Stowell and West (1994), which can then be compared to the data and other issues uncovered.

The design process (phases 1 – 7 of SSM<sup>XLTM</sup>) has to be connected with the management of technology process (phases 8 – 12). While the later phases of SSM<sup>XLTM</sup> were developed to examine an organisations technology base, the process was adapted to be used by a team who through the outcome of the exploration phases, now want to implement an ISA. The process of moving from the ‘soft’ aspects of ISD to the ‘harder’ more structured aspects has to be undertaken. While the move is not straightforward, and is argued can only be navigated (cf. Champion, Stowell and O’Callaghan, 2005; Gu, Wu and Stowell, 2000; Stowell, 2000), it is possible to build on the learning emphasis generated in the first phases of SSM<sup>XLTM</sup>. Within each phase of identification, selection, acquisition, exploitation and protection and evaluation, an emphasis on the theories of the learning organization can be focused upon while the technological aspects are being undertaken. Through the recursive nature of the SSM<sup>XLTM</sup> framework, the SSM<sup>XL</sup> framework developed could be used within each phase if required to help a team consider how implementation should commence. This work all adds to help individuals filter out unsuitable ISA before the more practical and technological aspects of the project can begin through identifying, selecting, and acquiring the most suitable ISA before bringing the ISA into an organisation. If after a period of time participants acknowledge the ISA is not performing as well as it should be, but cannot be exploited any further, a problem may have presented itself to a team. This can be argued to be drawn out through the learning SSM<sup>XLTM</sup> generates. The SSM<sup>XLTM</sup> framework is the outcome of this research that accommodates the exploration, design, implementation, and management process of information system applications. The processes are considered to be philosophically compatible (cf. Hirschheim and Klein, 1989) as well as offering a ‘systems’ perspective to learning through ISD projects.

*The development of a learning framework encompassing the design and implementation of ISA* emerged out of a process of action research within BreathCo and HealthCo. The SSM<sup>XL</sup>™ framework developed is just one-way information systems applications (ISA) can be designed and implemented, which can enhance the learning capabilities of individuals within organisations. This SSM<sup>XL</sup>™ framework is the main contribution to knowledge that this research provides. The SSM<sup>XL</sup>™ framework has drawn on the work of SSM and client led approaches but this research has tried to show that the thinking of the learning organization can be used and has helped individuals within organisations generate further learning. Where SSM could be argued to generate learning in its own right, it is considered that the main learning is for the practitioner or researcher with the participants achieving minimal learning capabilities. The SSM<sup>XL</sup>™ framework has tried to embed learning processes within it and be explicit in enabling thinking about learning. In order to do this the participation of individuals is important.

Without the participation of individuals in both cases, the tools used would not have been successful in drawing out tacit issues allowing these to be dialogued. It can be stated that this was more successful at BreathCo due to the greater ownership these participants wanted to have over the data collected. It is unknown if this would be able to have happened at HealthCo as the project was suspended. What was clear was that where participation was encouraged, the project leader wanted the investigation to be primarily led individually by the researcher drawing on other participants' expertise. While this firstly had the advantage of not getting sidetracked, confused and moving away from the framework, it was believed that vital issues could be missed as well as limiting the learning these participants could have achieved by participating more and being co-opted into the research process.

Secondly, by gaining more participation more tools, techniques, and processes could be used to focus on the problem situation, as participants will see the benefits and be able to use the outcomes as opposed to completing some work for a consultant or other managers who have asked for it and rely only on tools they are familiar with. The main tool used for the HealthCo project was IDEF0 to try and model key processes relating to starters and leavers and provide the participants with the outcomes to hopefully co-opt them into the research process. It was at this point that the project was suspended. The main conclusions drawn from the HealthCo case was the tacit use of identification, selection, acquisition, exploitation and protection (ISAEP) issues as part of IS implementation and management projects, even if they are not acknowledged formerly. The SSM<sup>XL</sup>™ framework attempts to

help participants such as those at BreathCo and HealthCo to use a learning approach to design an IS, and carry this learning into the implementation and management aspects of an ISD project. The designed and implemented ISA from undertaking such an approach is hoped to reduce IS failure.

A further advantage of SSM<sup>XLTM</sup> is the attempt to merge the softer and harder issues of ISD projects. While other methodologies (e.g., Multiview) have undertaken a similar process, it is argued that the change from the soft to the hard does not concentrate on specific technological issues (e.g., entity relationship diagrams) but on generating dialogue about how these issues need to be undertaken. The SSM<sup>XLTM</sup> framework is designed to focus participants on what aspects need to be undertaken. From this thinking, the framework can be undertaken as a formal methodology, or as a way to think about how an ISD project needs to be designed and implemented through the learning that can be achieved. This research has contributed to knowledge in a number of ways. These contributions are:

- Development of a framework that has embedded learning into the design and implementation of ISA.
- Development of a methodology for using the SSM<sup>XLTM</sup> framework that provides both rigor, but has not harmed the participants of the research, but encouraged them to participate more formally in the research process.
- Challenging academic thinking in the areas of IS design and implementation, and learning organization thinking, and promoted this in two organisations that would normally reject such thinking.
- Identification of key factors for individuals within organisations who wish to become learning organizations as stated by the literature at this point in time, and attempted to use them in practice through an IS design and implementation framework.

From this research and the resulting SSM<sup>XLTM</sup> framework a number of issues can now be provided to a number of individuals, including academics, consultants, and other practitioners who may want to use the SSM<sup>XLTM</sup> framework, managers within organisations, and teams and participants who want to use the framework. The issues for these individuals include:



*For Academics*

- The issues of moving from softer subjective perspectives to more structured perspectives still need to be explored.
- Using SSM as an approach to IS design.
- Using and enhancing learning organization thinking within the SSM<sup>XL™</sup> framework.
- Developing tools and other processes that can aid in systems thinking and modelling.
- Identifying and seeing how other theories of learning could contribute to enhancing learning within organisations.

*For Consultants and Other Practitioners*

- Using the SSM<sup>XL™</sup> framework as a way to design and implement ISA on behalf of individuals within organisations.
- Drawing out the learning organization thinking in practice.
- How the SSM<sup>XL™</sup> framework would be presented to individuals of an organisation as a process for IS design and implementation.

*For Managers of Organisations*

- Understanding the advantages of teams using the SSM<sup>XL™</sup> framework.
- Allowing participants to lead ISD projects through using the SSM<sup>XL™</sup> framework.
- Understanding how a number of IS projects can be managed more effectively if the SSM<sup>XL™</sup> framework is used.

*For Teams and Other Individuals*

- Allows participants to take a more hands on and client led approach to IS design and implementation.
- Provides teams further tools and techniques to enable more enhanced discussion of problems and explore solutions that are more effective.
- Enhance communication, dialogue, and learning activities.
- Allows language to be developed with IT specialists and other technological individuals in defining IS requirements.
- Provides a central focus on what issues need to be accomplished more explicitly in order to undertake an ISA project.

This section has stated the conclusions and contribution to knowledge that this research has provided. The final issue that considers different individuals who may come across the SSM<sup>XLTM</sup> framework (i.e., academics, consultants and other practitioners, managers and teams and other individuals) also paves the way for providing areas for future research.

## 10.2 Recommendations for Future Research

From conducting this research and having drawn conclusions, recommendations for future research include the following.

### *Re-test the SSM<sup>XLTM</sup> framework.*

Throughout this research and the proposed joining of the two processes to make a learning framework to designing and implementing ISA, the SSM<sup>XLTM</sup> framework has not been fully re-tested. The SSM<sup>XLTM</sup> framework needs to be investigated through each stage from the unstructured problem needing to be expressed through to protecting and evaluating an ISA, if that was the purposeful action selected.

### *Make the SSM<sup>XLTM</sup> framework explicit.*

In both cases in this research, the frameworks (the SSM<sup>XL</sup> framework and the SSM<sup>XLTM</sup> framework) could not be made explicit. On re-testing the SSM<sup>XLTM</sup> framework, cases need to be sought where participants will allow the SSM<sup>XLTM</sup> framework to be made explicit as a way to undertake a project ('mode 1') as well as ways to see a problem situation ('mode 2') and investigate what further advantages and limitations this possesses. A workshop could be conducted before the project begins similar to what Mumford (1995) proposes when using the ETHICS approach.

### *Look at the theories of the learning organization further.*

The theories of the learning organization were incorporated into the SSM<sup>XLTM</sup> framework to try and create the advantages that the field claims, and apply them to the design and implementation of an ISD project. Tools used within the SSM<sup>XLTM</sup> framework related to IS approaches to try and tease out the learning organization conditions argued for. Focusing upon approaches started by the learning organization (e.g., Senge et al., 1994), tools for building the learning organization could be more formally addressed through the phases of SSM<sup>XLTM</sup>. While the IS tools used were hoped to implement double-loop learning (e.g., Argyris and Schön, 1978, 1996) and

disciplines of the learning organization, no specific tools as developed by these authors were used in the cases, but they should try and be incorporated in the future.

*Try and develop tools and techniques that can be used with the SSM<sup>XLTM</sup> framework into a formal workbook.*

While the approaches and processes incorporated within SSM reside within a researcher to facilitate a group of individuals, the technology management aspect researched has developed formal workbooks that individuals can use (see Phaal, Farrukh and Probert, 2001). To try and help participants undertake the tools and techniques within SSM<sup>XLTM</sup> without the requirement of a facilitator, a workbook containing hints and tips needs to be developed. For example, advice on constructing root definitions and conceptual models, client led modelling approaches (e.g., AIM Venn diagrams see West, 1995), using approaches from Senge et al's., (1994) field book and identifying single and double-loop learning could be included. This approach could be aided by technology itself such as West (see West, Stansfield and Stowell, 1994) has with AIM and other authors have with reference to undertaking SSM and in constructing rich pictures (see Avison and Golder, 1991; Avison, Golder and Shah, 1992; Davenport and Ayers-Hunt, 1995; Stowell and Stansfield, 1991). What would need to be kept in mind is that such an approach does not restrict or turn SSM<sup>XLTM</sup> into a more structured methodology that inherits 'hard systems thinking' problems criticised throughout this work

*Finally, further work has to be conducted using the SSM<sup>XLTM</sup> framework within organisations that use other approaches to IS development.*

While organisations are sought that call for participation of IS design through individuals and other stakeholders, these individuals may rely on other processes (e.g., GREAT and PRINCE) and see how SSM<sup>XLTM</sup> can become commensurate with such processes that individuals favour.

Only by tackling such issues can this research be developed further. By undertaking such processes, many more questions may be posed than answered, but individuals within organisations can use IS design and implementation approaches to enhance their learning capabilities.

### 10.3 Methodological Implications

This research asked the question ‘how can a learning approach be incorporated into soft methodologies for the design and implementation of information systems applications (ISA)?’ In order to do this it was argued that taking an objective/positivist epistemology and accompanying methodology would be unsuitable. An interpretive/constructivist approach was explored and argued as being more suitable. Discussing constructionism as a philosophy related to how individuals constructed their realities with each other, as well as how the events of the research were constructed and interpreted. Utilising a methodology of a case study approach, which relates to taking a more interpretive/constructionist perspective, may find answering the objectives of this research difficult, due to not fully engaging with participants and expressing the issues and problems that the research possesses. An approach needed to be used which required more involvement in the area under investigation. Action research was the methodology adopted and was argued as suitable, especially where the work of IS is concerned. While action research is stated, an action research approach was developed that attempted to provide a participatory aspect that allowed individuals of each organisation to participate in the research, as well as allowing all participants to become co-researchers and co-subjects. These particular issues are not followed as much in traditional action research. Participatory action research (PAR) and co-operative inquiry (CI) was developed as the methodology that this research was to follow.

In order to avoid confusion about what the research was attempting to undertake, the unifying action research model as developed by Lau (1999) was used to draw out the key issues, and what the research will entail for the participants and the organisations. Within Lau’s (1999) work, he states the research process needs to be clearly stated. Extra attention was paid to this aspect with further tables being constructed to show how the cycles (of change intervention, reconnaissance, planned action steps, implement planned action steps, monitor implementation effects and evaluate) were undertaken within each case with a detailed description produced as Appendix C.

Once the projects were identified within each case, the methodology of participative action research with co-operative inquiry was attempted to be applied to avoid exploiting participants. This exploitation could have taken the form of coercing

individuals in using tools and processes that SSM<sup>XLTM</sup> incorporated which they would not want to use, even if are argued as useful. Through exploitation, the research process could have ultimately affected the perceived usefulness of the SSM<sup>XLTM</sup> and the outcome of each project. This can take the form of addressing the issues of power and knowledge with research (see Gaventa and Cornwall, 2001).

The discussion at the end of the previous chapter drew out a number of issues relating to SSM as developed by Checkland (1993) and Checkland and Scholes (1990). One of these issues related to ‘mode 1’ (a process to follow) and ‘mode 2’ (a way to think about) use of SSM. The SSM<sup>XLTM</sup> framework developed while mainly being used in ‘mode 2’, it was hoped to be used as more of a ‘mode 1’ aspect by the participants. By trying to encourage participants to be co-researchers and co-subjects, participants did not want to learn the techniques involved in using the SSM<sup>XLTM</sup> framework which ultimately led to a more ‘mode 2’ perspective. The SSM<sup>XLTM</sup> framework was used to think about how to structure the problem situation with other co-researchers. According to Checkland and Scholes (1990), the methodology of ‘mode 2’ users of SSM relates to reflecting on ideas daily, and through these many ideas, using SSM to make sense of them. This has been undertaken in the discussion in the previous chapter and has been concluded in this.

From this section it is argued that undertaking an ISD project in the way described in this research not only involves the participants, but provides these participants with learning opportunities, is ethical, and contributes to knowledge, but is more importantly worth undertaking. From the methodological implications discussed here, the researchers own personal reflections also need to be addressed.

#### **10.4 Personal Reflections**

From the implications the methodology has drawn, it is important to also reflect personally on the research process. For example, Borkan (1999) poses six areas that should be addressed when undertaking a study of immersion/crystallisation if the conclusions drawn can be argued to be valid. The areas Borkan (1999) states include: reflexivity, depth of description, accuracy, rigor and intellectual honesty, and searching for alternative hypothesis and interpretations. One other issue considered important that needs to be addressed relates to the future use of this research and the

data collected. These issues will now be addressed as part of reflecting on the research process undertaken.

*Reflexivity:* Borkan (1999) states experience is required to perform effective immersion/crystallisation techniques. These issues were tackled in this research by:

- The researcher having a background in management studies (first degree) and a background in business information technology (second degree), which provided an academic platform to undertake this study and be able to draw suitable conclusions.
- While this fact on its own may not be enough, the amount of time spent within BreathCo is highlighted. This time allowed a greater amount of reflexivity as time was taken to record instances of life at BreathCo and reflects on how such issues play a role in organisational life.
- From the observations, informal discussions were reflected on with participants of each case.
- It is stated that the reflexive nature of this research has been obtained through grounding the research in the real world.
- Key informants provided highly suitable data and gave a lot of their time for formal data collection methods, informally allowing observations to be made, as well as allowing questions to be asked and pointed to other individuals that would be useful to talk to. However, other participants were sought who could provide other interpretations, contradictions, or different insights to the issues that were being drawn out.
- Reflexivity was obtained through conversations with the supervisory team. This reflection was able to take place away from the research sites with focus being placed on the data being collected and analysed with a continuing questioning process being undertaken that made the researcher reflect on both cases, the participants, and what was being drawn from the data.

*Depth of Description:* Borkan (1999 p193) argues by addressing the depth of description, restricts a researcher from making bad generalisations and checks that a

researcher has investigated other possibilities and the prospect of different outcomes. These issues were addressed by:

- Providing a detailed description of the journey embarked upon with the participants.
- As can be seen throughout the analysis both female and male participants were involved within both projects. While not purposefully selecting an equal number of female and male participants both genders have been consciously represented.
- Being a young(ish) male of British ethnicity, it could be argued that a female of an ethnic minority may have drawn different conclusions. To defend himself against such criticisms, this researcher can only state that he is aware of such issues and has tried to avoid such problems.
- The depth of this research can be argued to come from the number of interviews conducted in both BreathCo and HealthCo.
- Along with these interviews a diary was kept that recorded a variety of issues, processes, and reflective aspects of the research process.
- To accompany these data collection methods the Venn diagrams from AIM was used to collect data, which paved the way to conducting the rich pictures that were developed. This particular strategy allowed an iterative process for finding out as well as grounding the data in the world as seen by others, and is argued to increase the depth of the research and allowed more description to take place.
- Through discussing aspects of the research with this supervisory team, comprising of one female and two males, together and separately, it is argued the issue of gender biases has been reduced even if it can not fully be removed.

*Accuracy, Rigor, and Intellectual Honesty:* While these issues could be dealt with separately, it is proposed that all three are related and should be dealt with together as a weakness in one can undermine the other two. These issues were dealt with in this research by:

- Using the advantages of the methods adopted as well as recognising the criticisms that each has attracted.
- Methods were attempted to be used in conjunction with each other to improve the accuracy of the research as well as the rigor.
- A diary was used to record the learning processes as they occurred.
- It could be argued that other methods should have been used, or the methods should have been used in another way. It has to be pointed out that the ethics of this research tried to adopt methods and approaches that will not harm the participants, or the organisations, where they work.
- The methods used are argued to have accurately recorded the data with the help of or by the wishes of the participants within both cases.
- The data collected could have been distorted with certain interpretations being favoured over others. It can only be stated that this was not the case with the research being conducted to the best of the researcher's ability and is intellectual honest.

*Searching for Alternative Hypothesis and Interpretations:* Strauss and Corbin (1998 p97) state that all researchers as well as participants of the research make assumptions, have beliefs, and draws on biases. The authors continue by adding that while this is not a disadvantage overall, it is important to recognise when such issues appear within research (Strauss and Corbin, 1998). Strauss and Corbin (1998) elaborate by recognising such issues when a culture and other meanings are taken for granted can be difficult. These issues were identified by:

- Asking questions that address how these findings can be interpreted. Through identifying these different interpretations and reflecting back on the literature the management of technology model was perceived as having a role to play for participants in firstly, implementing and managing IS projects, and secondly, further generating learning activities through thinking about or undertaking the process.
- This particular model may not have been identified if other interpretations were taken.



While it is not possible to remove all biases from the research process (Strauss and Corbin, 1998), attempts were made to reduce them. For example:

- One approach was resisting 'premature or delayed closure' (cf. Borkan, 1999).
- Using a process of action research with a clear approach of action, reflecting and learning having been specified, both positions (premature closure or keeping the research process open) it is argued, have been avoided.
- While the overall research timetable overran, enough time was taken for data analysis, presenting the data, and writing this thesis.
- All data was analysed and written up in a format that could be included within this thesis. While it is not practical to present every aspect of the data analysed with only summaries being presented, it is pointed out that if required, such analysis can be included.
- Undertaking such a task could be seen to add extra work but allowed different perspectives to be seen, alternative explanations to be sought, and other hypothesis to be followed while sticking with main themes and objectives of the research.

*Future Use of the Research and Data:* It was made clear to all participants in both organisations that the research conducted could be written up and published in journals. Participants did not object to such issues as it was made clear that they would always be disguised and participants could contact the researcher at any time in the future, and request any papers, or this thesis if they so wished. It is argued that due to the nature of this research on IS and the methodology adopted, not many ethical dilemmas presented themselves that other disciplines (e.g., psychology) face. It did not mean that ethical issues in this research were ignored. As Wainwright and Rossin (2003 p1) warn, IS projects could influence researchers as well as participants jobs, security and chances for promotion. It is with issues and warnings such as these that were kept in mind throughout the research.

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## Appendix A – Summary of Information Systems Development Methodologies and the Fifteen Stage ETHICS Process

### Information Systems Development Methodologies

Methodology	Characteristics	Comments on the Suitability of the Approach to IS Design and Implementation
Structured Analysis, Design and Implementation on Systems (STRADIS)	<p>STRADIS looks at breaking down a problem into smaller detail in a more disciplined way.</p> <p>Once at the lowest level the units can be controlled more effectively.</p>	This particular methodology is not seen as helpful to use or enhance learning activities because of this structured approach and the reductionism techniques that are applied.
Yourdon Systems Method (YSM)	<p>YSM is similar to STRADIS.</p> <p>YSM uses a 'middle up' approach to development and is seen as being more effective than a 'top down' or 'bottom up' approach.</p>	In summary YSM is very similar to STRADIS so for the same reasons that STRADIS was identified as not being helpful (structuring the approach too much and trying to reduce the elements involved) this also applies to YSM.
Information Engineering (IE)	<p>Information Engineering (IE) can be regarded as specifically focussing on data aspects.</p> <p>Information Engineering specifically takes a data-orientated approach by utilising entity relationships.</p>	This data is very important but by specifically focusing upon this aspect, other elements will be overlooked, which are also important. It is because of this aspect that IE is also not deemed as being a suitable approach to take for this project.
Structured Systems Analysis and Design Methodology (SSADM)	<p>SSADM is a methodology that the UK Government insists upon using for implementing applications for the government.</p> <p>SSADM is judged as containing a number of stages that can represent the "<i>traditional information systems development life cycle approach</i>" (Avison and Fitzgerald, 1995 p 262).</p> <p>Techniques SSADM utilise include data flow diagrams and tools such as computer-aided software engineering.</p> <p>The methodology contains seven stages which are passed through sequentially.</p>	<p>This approach does not allow individuals to go back and review past stages or change aspects of the project once they have been completed.</p> <p>As a project moves forward, new insights or thinking may become apparent that may indicate that earlier stages need to be revisited and revised.</p> <p>This can be seen as an aspect of learning that SSADM will not take into account, which is why this methodology is not viewed as being suitable for this work, but maybe suitable for other projects.</p>
Merise	<p>Merise is used for implementing information systems within public and private organisations and has been used in North America and Spain.</p> <p>The usefulness of Merise comes from the data processing aspects for databases as well as other real-time</p>	Even though Merise is prescriptive and other individuals, such as people who will use the system and management, can participate within the decision cycle, this methodology is still considered as not being suitable for the purpose of this research in helping with design, implementation, and

Methodology	Characteristics	Comments on the Suitability of the Approach to IS Design and Implementation
Merise continued	<p>environments.</p> <p>The methodology contains three phases, or cycles, namely <i>“the decision cycle, the life cycle and the abstraction cycle, which cover data and process elements with equal emphasis”</i> (Avison and Fitzgerald, 1995 p303).</p>	<p>management of IS with an emphasis on learning, as its primary focus is upon data and databases. Whilst defining specific data requirements are important, a methodology should not just focus on these issues only.</p> <p>The participative element however, is contemplated as being a more suitable approach when compared to the more structured methodologies such as STADIS, YSM, IE, and SSADM.</p>
Jackson Structured Programming (JSP)	<p>Jackson Structured Programming (JSP) tackles an IS as a large computer program.</p> <p>Jackson Structured Programming tries to deliver manageable software and the development of this software.</p> <p>As Avison and Fitzgerald (1995) quite rightly point out, this methodology primarily focuses upon the software whilst not taking account of the organisational factors.</p>	<p>Criticisms of JSP have been reviewed and are seen to relate to the value of the approach in the selection of a project, the requirements the system should possess, the management of the project and the participation of the users</p> <p>It is because of these criticisms that JSD can also be seen as a methodology that may not be helpful in aiding this piece of research.</p>
Object Orientated Analysis (OOA)	<p>Object Orientated Analysis (OOA) can be seen as a relatively new methodology in comparison to the others.</p> <p>There are a number of competing methodologies within the OOA area but Coad and Yourdon developed the most recognised in 1991.</p> <p>The basic principle of OOA is that by looking at an object and all of the parts that make up the object, which are described as attributes, the information system have effectively been identified.</p> <p>The methodology consists of five processes, namely: finding class &amp; objectives, identifying structures, identifying subjects, defining attributes and defining services (Avison and Fitzgerald, 1995 p328).</p>	<p>OOA moves away from structured methodologies, but it is believed the methodology focuses too much on precisely identifying and labelling activities without first discussing whether these activities are what are related to the problem.</p> <p>OOA does not address the ‘what’ problem only the ‘how’ to change (cf. Wilson, 1984) by identifying an object and all of its parts.</p>
Information Systems Work and Analysis of Change (ISAC)	<p>Information Systems Work and Analysis of Change (ISAC) methodology is focused more upon the people aspect of change.</p> <p>Information Systems and Analysis of Change seeks to find causes of a user(s) problem and solve the problem where suitable.</p>	<p>The point relating to whether to implement an ISA is the main criticism of the methodology. If an ISA is envisioned and then it is found that an ISA is not required, the process should continue until an outcome has occurred to try and better understand the problem in the first place.</p>

Methodology	Characteristics	Comments on the Suitability of the Approach to IS Design and Implementation
Information Systems Work and Analysis of Change (ISAC) continued	<p>The analysis and design aspect of ISAC is therefore the most known aspect of the methodology.</p> <p>A key point to highlight about this methodology is that the analysis does not assume that an ISA will need to be implemented to solve the problem.</p> <p>However, if the solution does not require an ISA to be implemented (through the analysis) the methodology is stopped.</p>	<p>The aspect of not implementing ISA unless they have a value to the individuals is a good one. Perhaps this point should be incorporated in any methodology that this work is searching for, as a problem has been identified, which is why a process has been selected to look at it.</p>
Rapid Application Development (RAD)	<p>Rapid Application Development (RAD) has been designed to help implement ISA quicker to meet constantly changing business requirements.</p> <p>Rapid Application Development uses a prototyping approach that incorporates CASE tools and systems repositories.</p> <p>RAD utilises four stages, namely: requirements planning, user design, construction phase and cutover.</p> <p>It is important to note that the methodology has been linked with IE even though it does not have to be.</p>	<p>The thinking applied here is the same as Avison and Fitzgerald (1995) as Rapid Application Development does take a perspective on other issues, such as higher-level requirements of the system at the strategic level.</p> <p>People involved at these discussions however, have to be senior individuals within an organisation with enough business and specific knowledge of the problem area.</p> <p>This requirement excludes people who might highlight other issues that have not been raised. The purpose of this exclusion is to speed up the time it takes to identify the requirements, which is why only senior people who can make decisions are involved. Therefore, an ISA may be implemented that is not suitable for the users.</p>
KADS	<p>KADS is considered as a methodology to develop expert systems.</p> <p>KADS has been developed as part of a European Union research project undertaken to develop knowledge base systems.</p> <p>It should be noted the similarities of expert system methodologies with ISD methodologies which include the requirement of good project management, quick development, a fit to organisational strategy, a good requirements analysis and a good design to name a few.</p>	<p>Avison and Fitzgerald (1995) argue that expert system methodologies may have something more general to provide to IS methodologies, and whilst not rejecting this fact, at this stage, KADS and other expert system methodologies would not be of value to this work unless the ISA being implemented is focussing on expert systems specifically.</p>
Euromethod	<p>Other methodologies such as SSADM, Merise, and IE have helped in designing Euromethod whilst the methodologies main features relate to planning and managing an IS.</p>	<p>The emphasis on Euromethod being a framework as opposed to just a methodology is believed a good approach to take, as the approach may be altered to take account of specific</p>



Methodology	Characteristics	Comments on the Suitability of the Approach to IS Design and Implementation
Euromethod continued	<p>Euromethod is more of a framework than a methodology through the emphasis upon planning and managing an IS.</p> <p>The methodology is focused upon the market place of organisations that either are selling ISA or require the services of ISA.</p>	<p>issues.</p> <p>This methodology is less of an implementation methodology, but focuses more upon the end result of an implemented ISA and would not be suitable primarily in the development aspect.</p> <p>Euromethod incorporates aspects of other methodologies including SSADM, Merise, and IE which have been reviewed as taking a too reductionist approach or concentrating on a specific issue whilst neglecting other issues.</p> <p>As the methodology is quite new, companies will have to spend time and money testing it.</p>

Table A.1  
*Eleven Examples of Different Methodologies Available For IS Design and Implementation*  
 Adapted From: Avison and Fitzgerald (1995)

**The Fifteen Stage ETHICS Approach**

1. Why Change?	As this stage suggests the reason for change is discussed. The outcome of this stage should be a convincing argument that change is required.
2. System Boundaries	The boundary of any system needs to be identified. <i>“Four areas are considered: business activities affected (for example, sales, finance and personnel); existing technology affected; parts of the organisation affected (for example, departments and sections); and parts of the organisation’s environment affected (for example, suppliers and customers)”</i> (Avison and Fitzgerald, 1995 p358).
3. Description of Existing Systems	This stage looks at the existing system and how it works. This stage is designed to see the whole ‘system’. A number of activities are identified which include the high and low level activities and how are they all co-ordinated. A number of ‘work sheets’ are constructed to collect this data to end up with the activities that have to be performed in the correct order.
4, 5 and 6 Definition of Key Objectives and Tasks	The questions asked to undertake this stage are: what is the purpose of a particular area and why does it exist; what responsibilities should these areas undertake; and how do these current activities achieve these tasks. From the answers objectives can then be listed.
7. Diagnosis of Efficiency Needs	Any current problems that the existing ‘system’ possesses are documented.
8. Diagnosis of Job Satisfaction Needs	As the stage suggests this issue is concerned with investigating job satisfaction for the potential users. A tool that has been developed as part of ETHICS is used. However, this questionnaire can be altered to suit the situation. The outcome of the questionnaire is discussed.
9. Future Analysis	Whatever the proposed outcome it has to be more suitable than what currently exists as well as be flexible enough to be altered to take into account any future changes that may occur.
10. Specifying and Weighting Efficiency and Job Satisfaction Needs and Objectives	This stage is a crucial part of the whole ETHICS approach. The objectives that are part of this stage are derived for the past three stages. The objectives are ranked and have to include all participants. The purpose is to discuss any differences that are present.
11. The Organisational Design of the New System	It is deemed that this stage and the next (technical design) should be undertaken at the same time. This stage can throw up a number of alternative ways to achieve the desired change. Going back to stage five, objectives are now elaborated and are used to answer the following questions, <i>“what are the operating activities that are required?; what are the problem prevention/solution activities that are required?; what are the co-ordination activities that are required?; what are the development activities that are required?; what are the control activities that are required?; what special skills are required, if any, of the staff?; are there any key roles or relationships that exist that must be addressed in the new design?”</i> (Avison and Fitzgerald, 1995 p360 – 361. the options discussed have to meet the objectives of stage ten which requires having to consider socio-technical issues which is an important aspect of the methodology.
12. Technical Options	At this stage the technical aspects of hardware and software as well as how the technology will look is discussed and identified. All options are evaluated in a similar manner to the organisational options.

## Appendix A

### Summary of Information Systems Development Methodologies and the Fifteen Stage ETHICS Process

13. The Preparation of a Detailed Work Design	Whatever the technology selected it is now designed through factors such as data flows, responsibilities and what individuals are involved, for example. The design still has to be compared to the objectives to make sure they are still compatible.
14. Implementation	The implementation of the designed technology has to be passed so that a strategy can be formatted to take into account issues such as training in a coherent manner.
15. Evaluation	The technology has to be evaluated to make sure that it meets the issues it was introduced to achieve. If this evaluation reveals that the technology is not, action is taken to correct this situation.

Table A.2

#### *The Fifteen Stages of ETHICS*

Adapted From: Avison and Fitzgerald (1995)

## Appendix B – A Summary of the Conditions that Make Up a Community of Practice

### B.0 Introduction

This appendix expands the work detailed in section 3.3.3 of chapter three on communities of practice (COPs). Within section 3.3.3, an overview of the four components (practice, meaning, community, and identity) that make up a community of practice (COP) was stated. This appendix however, is designed to go further to produce further insights into each component, and demonstrate why a community of practice requires all four components to be present. The appendix is structured around each component, starting with practice, then moving onto meaning, community, and finally identity.

### B.1 Practice

Wenger (1998) regards practice as relating to ‘doing’, however, this doing reflects a historical and social process to allow structure as well as meaning to be given to activities an individual undertakes. Oyeleran-Oyeyinka (2004) agrees when he states learning by doing (practice) is very important, especially where issues such as apprenticeship are required. Brown and Duguid (1996) continue by stating that they see a gap existing between working, learning, and innovating, due to the separation of these issues from practice. Wenger (1998) therefore takes account of practice containing both the tacit and explicit issues referring to what is spoken and what is not, what is brought to people’s attentions, and what is just assumed that people know; as well as the language that is used to discuss issues, along with other forms of communication (e.g., symbols, codes of conduct, and individuals roles). A community therefore, needs to understand what issues are related to the domain of that ‘practice’, and what each can achieve (Wenger, McDermott and Snyder, 2002). Brown and Duguid (1996) find it strange that ‘practice’ is not paid more attention to, once the theory of ‘practice’ is understood. This may be because ‘practice’ can also include the tacit cues and rules as well as “*recognisable intuitions, specific perceptions, well-tuned sensitivities, embodied understandings, underlying assumptions, and shared world views*” (Wenger, 1998 p47) which makes the process

problematical. Whilst these tacit issues may be difficult to identify and investigate, they are part of being a member in a community of practice (Wenger, 1998).

Along with the above issues forming practice, Wenger (1998) uses the term ‘practice’ to not separate the process of acting and knowing, but involves both acting and knowing together. Brown and Duguid (1996) supports this issue as they examine learning as being undertaken through structure and using what processes (e.g., language, dialogue) are available. Work is therefore undertaken through collaboration (Brown and Duguid, 1996). Lave and Wenger (1991) continue by pointing to language as a very important aspect of ‘practice’. The problem is that whilst practice is perceived to generate knowledge, this knowledge has to be managed effectively, if it is not to become useless (Wenger, McDermott and Snyder, 2002). Wenger (1998) continues by stating practice is not labelled in contrast to a theory, neither is the term split. For example, the practical aspect of the theoretical aspect as a community of practice includes these issues, even though all individuals have their own way of understanding (Wenger, 1998). Communities of practice therefore are considered as a place to come and try and understand the world (Wenger, 1998), or as Brown and Duguid (1996) state, practice is a very important process in understanding how work is undertaken. Being involved in practice can allow developmental learning to be achieved through the tasks individuals undertake, which allows the task to be reflected upon (Nyhan, 2004). From these issues, “*successful practice building goes hand-in-hand with community building*” (Wenger, McDermott and Snyder, 2002 p40).

## B.2 Meaning

Wenger (1998) identifies ‘meaning’ through ‘practice as meaning’. Wenger (1998) goes through and discards a number of explanations of what ‘practice as meaning’ refers to. Wenger (1998 p52) finishes by stating, “*practice is about meaning as an experience of everyday life.*” This meaning could be attributed through what Brown and Duguid (1996), as well as Illeris (2003) regard as social construction. A constructed understanding through individuals, therefore, can help shape each others world (Brown and Duguid, 1996). Wenger (1998) builds his argument on exploring ‘practice as meaning’ through three stages: how the negotiation of meaning is undertaken, with participation and reification being the two processes that allow the negotiation of meaning to take place, and finally, participation and reification has to

form a link, if ‘meaning’ and ‘practice’ are to take place. These processes are summarised in Table B.1 below.

<i>Negotiation of meaning</i>	<ul style="list-style-type: none"> <li>Wenger (1998) believes negotiating meaning occurs quite frequently through such acts as thinking or doing. For example, language may be involved when negotiating meaning, but is not a necessity, neither does another individual have to be involved (Wenger, 1998).</li> <li>Meaning is believed to be a social activity that also incorporates knowledge and understanding (Lehesvirta, 2004).</li> <li>Wenger, McDermott and Snyder (2002) do state that a well designed community locates and brings information from other places into the dialogue of the community.</li> <li>Wenger (1998 p54) states “...<i>meaning is always the product of its negotiation, by which I mean that it exists in this process of negotiation. Meaning exists neither in us, nor in the world, but in the dynamic relation of living in the world.</i>”</li> </ul>
<i>Participation</i>	<ul style="list-style-type: none"> <li>Wenger (1998 p55) argues, “<i>participation refers to a process of taking part and also to the relations with others that reflect this process.</i>”</li> <li>Wenger (1998) adds that to be participating, an individual has to be undertaking this actively. The use of technology therefore, does not have an active part to play within a community, but could be an aspect in helping the community to undertake their tasks.</li> <li>Participation is required for three reasons; firstly, participation reflects basic values and respect for individuals; secondly, participation embodies democratic issues; and finally, participation is relevant to achieving organisational goals through the positive effects participation brings (Lines, 2005).</li> </ul>
<i>Reification</i>	<ul style="list-style-type: none"> <li>Reification along with participation is argued by Wenger (1998) as a useful concept to examine interacting with the world in the act of creating meaning.</li> <li>Wenger (1998) reiterates participation as the perspective an individual has of themselves with others; whilst reflection is compared as the projection of an individual onto the world, without the problem of finding oneself within the projection.</li> </ul>
<i>Linking participation and reification</i>	<ul style="list-style-type: none"> <li>Wenger (1998) believes participation and reification, and the relationship between the two are both separate and complementary, however, neither can be identified in isolation; therefore, to perceive and comprehend one it is necessary to comprehend the other aspect.</li> <li>“<i>Participation and reification must be in such proportion and relation as to compensate for their respective short comings. When too much reliance is placed at one at the expense of the other, the constructing of meaning is likely to become problematic in practice</i>” (Wenger, 1998 p65).</li> </ul>

Table B.1  
*The Processes that Make up Meaning*

Table B.1 shows four issues that are considered to relate to the process of ‘meaning’ within a community of practice. Whilst all of these issues are important, the area of participation has received a lot of interest in both the IS literature (e.g., Mumford,

1995, 1997; Mumford and Weir, 1979; Stowell and West, 1994) as well as the learning organization literature (e.g., Billett, 2004; Hurley, 2002; Senge, 1990). Whilst the points are brief, Table B.1 tries to demonstrate that ‘meaning’ is made up of a number of issues that could be difficult to formally manage. This could also be applied to the process of ‘community’ which is reviewed next.

### **B.3 Community**

It has been reviewed that participation is required within a community of practice. Communities however, develop to reach their potential rather than starting out that way; development may require individuals to foresee possibilities that are not currently identified (Wenger, McDermott and Snyder, 2002). When Wenger (1998) associates practice with community, it is not the same as a community having practice. For example, a residential street may be labelled a community, but it may not be a community of practice (Wenger, 1998; Wenger, McDermott and Snyder, 2002). Playing a musical instrument requires practice, but is not a community of practice (Wenger, 1998; Wenger, McDermott and Snyder, 2002). When the terms ‘community’ and ‘practice’ are placed together, it achieves two things: firstly, a more manageable aspect of the term practice, and secondly, allows a special form of community, which is stated as a ‘community of practice’ to be undertaken (Wenger, 1998). A community of practice is where all individuals that participate do so on multiple levels (Lave and Wenger, 1991). A vision for the community therefore, will enable relationships to flourish and trust to be built (Ghosh, 2004; Wenger, McDermott and Snyder, 2002), where all individuals share an understanding about how the community relates in their lives (Lave and Wenger, 1991). Bessant, Kaplinsky and Morris (2003) can be seen to agree, when they review a study they undertook, which researched co-operation between firms. Even though firms were used, they found co-operation to depend on trust, no matter what incentives were offered (Bessant, Kaplinsky and Morris, 2003). For a community to be engaged with ‘practice’, three processes are required, which allow the practice elements to be achieved, these are the processes of mutual engagement, a joint enterprise, and a shared repertoire (Wenger, 1998) which can be seen in Table B.2.

## A Summary of the Conditions that make up a Community of Practice

<i>Mutual engagement</i>	<ul style="list-style-type: none"> <li>• Mutual engagement can be described by Wenger (1998) as people doing what they do through mutual engagement.</li> <li>• A community is not just a group of people working together, but can occur if these people maintain a relationship of mutual engagement, as this is what defines a community of practice as opposed to just a community (Wenger, 1998).</li> <li>• Within a community barriers, that usually define relationships (e.g., status or title) have been removed, along with current working practices which allows the issue of trust to be built up (Ardichvili, Page and Wentling, 2000; Wenger, McDermott and Snyder, 2002).</li> <li>• Wenger, McDermott and Snyder (2002) take account of three levels within communities, namely the core, active and peripheral levels.</li> <li>• The core is at the centre, or heart of any community, and is usually the smallest element (Wenger, McDermott and Snyder, 2002). These members are the individuals who will identify issues for the community, as well as take charge of the learning processes perceived to be important, as they are seen as leaders of the community (Wenger, McDermott and Snyder, 2002).</li> <li>• The next group are identified as 'active' members of the community, who are involved in the community, but do not contribute as frequently as the core members to the issues being discussed (Wenger, McDermott and Snyder, 2002). A majority of any community of practice are peripheral members who only contribute in minor ways (Wenger, McDermott and Snyder, 2002).</li> <li>• Being on the periphery could be perceived as not enhancing a community however, Wenger, McDermott and Snyder (2002) disagree, as they state peripheral members are very important.</li> <li>• A fourth category can be identified that is not part of the community, and that is the role of the 'outsider', who is interested in the work a community may be undertaking (Wenger, McDermott and Snyder, 2002).</li> <li>• If an individual is placed into one of the levels, it does not mean that this is fixed. For example, individuals could drift from the periphery to the core and to being an outsider, depending on the topic (Wenger, McDermott and Snyder, 2002), or change of social relationship within a community (Lave and Wenger, 1991).</li> <li>• Lave and Wenger (1991) cast doubt on whether there can truly be a central point within participation. This argument comes from the perspective that participation is undertaken within the social world, where changes take place that alter an individuals trajectory, identity, and the membership they create (Lave and Wenger, 1991). It is argued that exploring communities in this way is helpful.</li> </ul>
<i>Joint enterprise</i>	<ul style="list-style-type: none"> <li>• Joint enterprise is believed to contain three processes that allow a community of practice to be held together, namely, the individuals that make up the community are able to negotiate, which allows mutual engagement to be undertaken (Wenger, 1998). The other two processes relate to how the community is defined by the individuals who make up the community through undertaking it; and individuals are allowed to create joint accountability (Wenger, 1998).</li> <li>• Individuals may voluntary join a community or may get selected to join a</li> </ul>



	community, but how much an individual engages within the community is up to the individual (Wenger, McDermott and Snyder, 2002), which is related to the joint enterprise created.
<i>Shared repertoire</i>	<ul style="list-style-type: none"> <li>• Wenger (1998) believes a shared repertoire generates the process for dealing with meaning.</li> <li>• Brown and Duguid (1996) consider the stories employees share as relating to solving problems, which have not been previously encountered. This is considered to add to the shared repertoire of the community.</li> <li>• Within a community of practice, the shared repertoire can include many forms of communication, such as words and symbols, what the community has produced, and is now part of the community's practice (Wenger, 1998).</li> <li>• How this meaning is also undertaken comes through a shared repertoire that contains two characteristics. "<i>It reflects a history of mutual engagement</i>", and "<i>it remains inherently ambiguous</i>" (Wenger, 1998 p83).</li> <li>• The purpose of history refers to how things have been interpreted in the past, which are now shared (Wenger, 1998). History could be identified as a process that can hinder the organisation of a community, and how communication is undertaken, but is a process that is forever open and having the ability to produce new meanings (Wenger, 1998).</li> </ul>

Table B.2

*The Processes that Make up Community*

Table B.2 is similar to Table B.1, as it provides a brief overview of the processes that go to make up 'community'. Just like 'meaning', the processes that make up 'community' may be difficult for a manager to formally manage. Nevertheless, these issues must be present if the aspect of 'community', in this instance, and 'meaning' in the previous instance, are to be undertaken. How these processes can be identified formally is unknown, further highlighting the problems that surround all theories of learning. The final process that Wenger's (1998) Figure (shown in Chapter Three as Figure 3.5) displays, as being linked to learning, is that of 'identity' which is now reviewed.

**B.4 Identity**

Wenger (1998) highlights the process of 'identity' occurring within 'practice', 'meaning', and 'community'. Wenger (1998) decided to take account of these issues in part one ('practice') of his book, and leaves the second part to concentrate on 'identity'. When Wenger (1998) refers to 'identity', he explores how an individual builds their identity through negotiated meaning of that individual's experience, in being a member of a community. Wenger, McDermott and Snyder (2002) explore communities of practice as developing over time, in a way that allows them to

understand their topics, develop common practices to generating knowledge, as well as the practice itself, which in turn allows relationships to develop as well as a sense of identity to form. It is issues such as these that writers in areas such as ‘the learning organization’ highlight communities of practice as a valuable concept, if they can be allowed to form. With new individuals entering a community, they have to participate in the practice that has been developed within the community over time, as well as start to form their own identity within the community (Lave and Wenger, 1991).

Just like the process of ‘meaning’, ‘identity’ can be undertaken through the act of social construction by describing stories that help shape an individual’s identity within a community, which in turn can shape the identity of the community (Brown and Duguid, 1996). For example, individuals of the community can contribute to other individuals’ projects or work tasks, without having to participate within it if they do not want, as well as give and receive advice and help, with no pressure to accept the suggestions (Wenger, McDermott and Snyder, 2002). When taking account of ‘identity’ there is no point in focussing on the individual or the community, but on the structure of both (Wenger, 1998). *“In this sense, the formation of a community of practice is also the negotiation of identities”* (Wenger, 1998 p149). Lave and Wenger (1991) argue the combination of ‘identity’ and membership of a community to be linked with an individuals motivation; so an individual being a member of a community and actively participating within it, relates to an individual recognising the person undertaking ‘meaning’ and ‘action’.

Similarly to discussing the above issues through ‘practice’, Wenger (1998) sets out the second part of his book to look at the issues associated with ‘identity’. The issues related to ‘identity’ include: negotiated experience, community membership, learning trajectory, nexus of multi-membership, and the relation between the local and the global (Wenger, 1998). Each issue will receive a brief review to further explain the many issues that relates to communities of practice. These can be seen in Table B.3.

<i>Negotiated experience</i>	<ul style="list-style-type: none"> <li>• Wenger (1998 p151) perceives having an identity within the context of practice relating to <i>“a way of being in the world.”</i></li> <li>• Identities are not referred to in the same term as self-image, or how somebody else may think about an individual, but relates to how an</li> </ul>
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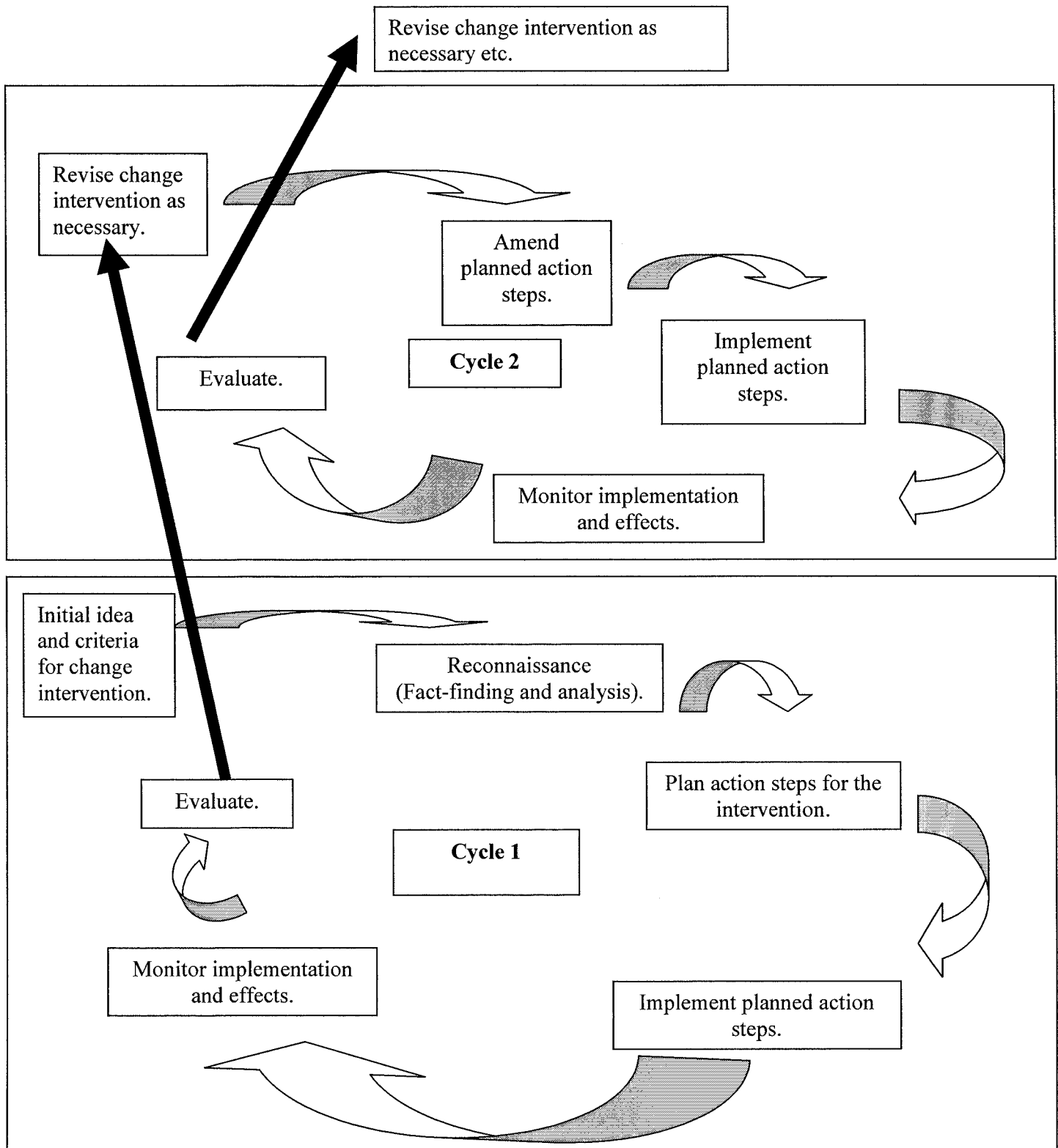
	<p>individual lives their lives (Wenger, 1998).</p> <ul style="list-style-type: none"> <li>• Identity is regarded as being defined socially through experiences gained in participating with communities (Wenger, 1998).</li> </ul>
<i>Community membership</i>	<ul style="list-style-type: none"> <li>• Wenger (1998) goes on to point to his argument that an individual's identity is modelled through the participation aspect.</li> <li>• Membership is related to the issues of competence that an individual brings, which relates to the identity process (Wenger, 1998).</li> <li>• An individual, who can be classed as a full member of a community, is known as competent, as well as being able to see competence within others, as engagement is part of the process (Wenger, 1998). Wenger (1998) goes back to the processes that make up 'practice' and explores them again through 'identity'. Mutual engagement identifies the action individuals undertake with others, which relates to aspects such as working together (Wenger, 1998).</li> <li>• Identity can be created through participating in the issues that relate to the 'community', and from this identity, it can be transferred back to a form of individuality within the community (Wenger, 1998).</li> <li>• To conclude, Wenger (1998 p153) states "...membership in a community of practice translates into an identity as a form of competence."</li> </ul>
<i>Trajectories</i>	<ul style="list-style-type: none"> <li>• Wenger (1998) believes that an individual's identity is constantly being re-negotiated.</li> <li>• As an individual moves forward with their lives and encounters various forms of participation, trajectories in relation to identity are created (Wenger, 1998).</li> <li>• This identity is created by reflecting on participation through the trajectories encountered (Lave and Wenger, 1991).</li> <li>• Wenger (1998) does warn that by using 'trajectories' he is not inferring an individual has a fixed course to follow.</li> <li>• Through exploring trajectories, Wenger (1998 p154) argues that, "<i>identity is fundamentally temporal; the work of identity is ongoing, because it is constructed in social contexts, the temporality of identity is more complex than a linear notion of time; and identities are defined with respect to the interpretation of multiple convergent and divergent trajectories.</i>"</li> <li>• In summary, Wenger (1998) states that 'identity', when regarded from the process of trajectory, forms a work that is in progress, and is both a collective and individual process – to create participation through time for an individual, which focuses upon the past and future to allow the experience of the present to be experienced.</li> </ul>
<i>Nexus of multi-membership</i>	<ul style="list-style-type: none"> <li>• The multi-membership Wenger (1998) refers to, relates to individuals belonging to many communities of practice, which may be important in creating an individual's identity, whilst others may not be as strong.</li> <li>• Wenger, McDermott and Snyder (2002) consider multi-memberships as the creation of a '<i>learning loop</i>' through the tasks individuals are responsible for undertaking, which helps improve their skills or change a previous solution in light of the completion of tasks, that have not been familiar to an individual or the community. Multi-membership therefore, shapes identity through experiencing these multi-memberships and holding one identity across the created boundaries (Wenger, 1998).</li> </ul>

	<ul style="list-style-type: none"> <li>Through being part of many communities, individuals come into contact with many different individuals that may offer conflicts as well as different competencies (Wenger, 1998).</li> </ul>
<i>Local-global interplay</i>	<ul style="list-style-type: none"> <li>Communities do not just focus on the local aspects but on a wider set of events (Wenger, 1998).</li> <li>For example, other aspects besides those that the community exists for, may be discussed, such as entertainment programmes or family life (Wenger, 1998).</li> <li>Wenger (1998) believes that an individual's identity may be shaped through a community; however, an identity may not stay fixed to that particular community. A community therefore can be considered as a place where an individual may undertake activities, how this commitment relates overall can also be explored (Wenger, 1998).</li> <li>An individuals 'identity' when it is related to 'practice' is considered to be present at both the local and higher global level (Wenger, 1998). Brown and Duguid (1996) highlight learning within a community relates to how communities are formed, and how individual identities change over time.</li> </ul>

Table B.3  
*The Processes that Make up Identity*

Table B.3 has summarised the issues that go to make up the process of 'identity'. It should be noted the intertwined aspects of one process requiring others to be present. For example, a 'community' requiring 'practice'. It may be argued therefore that if all the processes are present a community of practice could be said to form. The purpose of a community of practice however, involves the process of learning, which Wenger's (1998) figure (Figure 3.5 shown in Chapter Three) displays as its central feature.

## Appendix C – The Action Research Process for this Study



Source: Thornhill et al., (2000 P289)

Cycle And Phase Numbers	Description Of Phase	The BreathCo Project: The Design and Implementation of a Customer Complaints/Concern Management Technology (The Testing of the SSM <sup>XL</sup> Framework)
C1 P1	Initial idea and criteria for change intervention.	<p>How can a learning approach be incorporated into soft methodologies for the design and implementation of information systems applications (ISA)?</p> <p>Two organisations will be used.</p> <p>Contact with an employee of BreathCo in June 2002.</p> <p>Contact with the employee led the way to discussing possible projects that will satisfy the research question of this research. Other issues include not undertaking a project that will not harm participants of the organisation, as well as designing and implementing an ISA, which the individuals of the organisation require.</p> <p>These early discussions paved the way to allowing access to the organisation for identifying a suitable project.</p> <ul style="list-style-type: none"> <li>• The organisation has learnt that change needs to be managed.</li> <li>• The employee acknowledges that IS are part of an organisations operation, and need to be designed and implemented.</li> <li>• Through an early research proposal, the employee has acknowledged that ideas from academia might be useful.</li> </ul> <p>Through the first contact with the employee (a senior engineer of BreathCo), a research day (disconfirmation event) undertaken by an eminent Professor on the topic of how change is required at BreathCo was undertaken.</p> <p>The research day provided an introduction into the company, as well as introducing the researcher to the company.</p> <p>The day served as an initial reconnaissance phase. By informally talking with the employees, and through the workshop exercises that they had to undertake, the main perceived problems were identified to relate to communication between departments.</p> <p>Further reconnaissance came from an initial meeting with the customer services manager, who emphasised the problems that his department, and others, experience with both internal and external customers. This meeting led to access that allowed a two-week observation programme within the customer services department. This allowed the identification of how the customer services department and surrounding departments operate.</p> <p>The reconnaissance allowed the stream of cultural inquiry of SSM to be taken into account.</p> <p>From this observation, a project that met the aim of the research emerged. This project was initially entitled the 'Customer Complaints Management' project.</p>
Learning Outcomes		
C1 P2	Reconnaissance (fact-finding and analysis).	
Learning Outcomes		<ul style="list-style-type: none"> <li>• The researcher learnt of the communication problems that individuals within the organisation found and could relate this back to systems thinking, dialogue, and language, as well as to learning organization thinking.</li> <li>• The researcher also learnt that adopting some of these approaches might solve, or go part way, to highlighting the problem in a way that had not been undertaken before.</li> </ul>

C1 P3	Plan action steps for the intervention.	<ul style="list-style-type: none"> <li>• These thoughts were amplified through the two-week observation. The early reconnaissance was recorded in a diary, which included an initial insight into the organisation, and the problems they face. The emphasis upon communication and meeting customer expectations was further identified.</li> </ul> <p>Being present in the customer services department allowed an opportunity to talk with employees and ask further questions. This brought to the researcher's attention the start of a customer complaints management project.</p> <p>The project came about due to a company audit that found that no formal 'system' was in place to record customer complaints. This can be argued to take phase 1 of SSM<sup>XL</sup>.</p> <p>Early meetings were attended and documents that were produced were collected.</p> <p>Being a researcher, the team were happy for additional expertise to help undertake the project.</p> <p>It was decided that an initial investigation into the problem of customer complaints should be undertaken, which could then be fed back into the team. Investigation into the problem led to the planned action steps.</p> <p>The appreciative inquiry method's (AIM) (see West, 1995) Venn diagram work sheet, and semi-structured interviews, were planned to be used to collect the data, along with further observations to help structure the problem situation.</p> <ul style="list-style-type: none"> <li>• The researcher and the individuals now assigned to the team, learnt through early brainstorming that everybody could have a different perspective about the same problem, in this case how to solve customer complaints.</li> <li>• This thinking was further confirmed through the outcome of the AIM Venn diagram worksheet.</li> <li>• The individuals learnt that this project would be resolved if they were to improve communication, primarily with customers, but also with other departments within the organisation.</li> <li>• The individuals also learnt that the project had to be undertaken in a way that would provide an outcome that would satisfy the aim of the project, but would not take too much time, as they also had to complete their actual jobs as they were employed to do.</li> </ul> <p>The data collection methods were designed to be used in building the base of sharing a dialogue on the problem of 'customer complaints'. This work was undertaken during October 2003. The SSM<sup>XL</sup> framework was initially designed to be used in a combination of 'mode 1' and 2, in order to help focus the project.</p> <p>The AIM Venn diagram work sheet was produced and collected back, and the semi-structured interviews were undertaken.</p> <p>This aspect of the research will implement the combination methodology of participatory action research (PAR) and co-operative inquiry method (CI).</p> <p>As the researcher is part of the team to develop the customer complaints management technology, data was collected from: the meetings that were held, e-mails sent and received, and documents that were created for the project, through BreathCo's GREAT process. Participants of the team were identified through the initial project leaders, on the perspective of who receives or deals with complaints. These participants were approached to be interviewed to obtain their perspectives upon the project and the issue of 'complaints'.</p>
C1 P4	Implement planned action steps.	<ul style="list-style-type: none"> <li>• The researcher learnt that in order to help the individual's design a 'system' that would meet that aim of the project, the many different</li> </ul>
Learning		

Outcomes		<p>perspectives would need to be explored.</p> <ul style="list-style-type: none"> <li>The researcher learnt through the continuous literature review, that the best way to help undertake this project would be to incorporate learning organization thinking within an SSM framework. This expansion was developed within the literature which would then provide a framework to help conduct the project, but also further develop the necessary language for communicating different perspectives and separate departmental cultures.</li> <li>The researcher learnt that the best methodological way to conduct this whole process would be through eliciting the co-operation of all individuals, including the researcher.</li> </ul>
C1 P5	Monitor implementation and effects.	<p>The purpose of using the appreciative inquiry method's (AIM) Venn diagram, was to collect some quick data on each member of the teams perspective on 'what a customer complaint is' and 'why solving a customer complaint was important'. The results of this process led into the semi-structured interviews.</p> <p>This process seemed to be easy to undertake by all members of the team, as they could firstly complete the sheet from their own perspectives, and secondly, not take up too much of their time. In return, an initial insight into each participants thinking upon the problem situation, as well as demonstrating the many differences that each participant held on solving the problem was obtained.</p> <p>The participants who were interviewed seemed pleased that they could give an account of what they believed were the key issues, and how they should be solved.</p> <p>By allowing the interviews, the projects' awareness was highlighted. From the initial analysis of the interviews, it came across that the project was now moving forward in a direction that the participants were happy with. The methods undertaken so far therefore were stated as successful in collecting data that all participants were happy with.</p> <ul style="list-style-type: none"> <li>The individuals who had now formed the team highlighted the researcher had some good ideas, even though they were not precisely sure of what the end outcome of the analysis would be.</li> <li>The interview questions that the researcher asked formed a platform for each participant to think about how issues relate to the perception of the problems, and how their thinking would impact upon the project.</li> </ul> <p>A formal document was produced, from the interviews and AIM Venn diagram work sheets, to help participants see the different perspectives on what are essentially the same problems. This process led to the completion of stages one and two within SSM<sup>20</sup>.</p> <p>The team came to a joint decision, through the document that technology will have to be used in the solution. The method of letting an individual design the data collection instrument, and collect the data for the team, who could then discuss the findings in more detail, was deemed successful. One participant commented the document as more in depth then they could have achieved.</p> <p>It is argued that the tools used have helped develop learning activities about the problem situation and other process within BreathCo.</p> <p>Trying to identify learning through the learning theories declared is argued to help see learning activities taking place within an organisation.</p> <ul style="list-style-type: none"> <li>The individuals learnt that along with their process for solving problems, and processes contained within GREAT, can provide valuable guidance for a project. What was undertaken however, gave yet a further set of tools, which participants found helpful.</li> <li>Through the document that was produced, and the other processes that were completed, the individuals learnt how best to proceed with the project and what objectives would need to be accomplished to undertake a successful project.</li> <li>The researcher learnt that the techniques used so far were proving beneficial with the individuals, and that by becoming part of the team and not</li> </ul>
Learning Outcomes		
C1 P6	Evaluate.	
Learning Outcomes		



		leading the team in a pure action research approach, seemed to provide better research outcomes and more variety of solutions in exploring the problem situation.
C2 P1	Revise change intervention as necessary.	<p>The methodology designed to undertake the research was very important. As the project was driven by the stream of participatory action research, which also involved co-operative inquiry (CI), it would undermine the approach to try and influence the participants to undertake root definitions and conceptual model building espoused in SSM, as they were not keen. It is not so much a change or revision required, but to continue through SSM<sup>xi</sup> using tools and methods participants were comfortable with.</p> <p>The participants agreed that the best form of model building should be done on an Excel spreadsheet package, as all participants had knowledge of the package and had access to it. Another influence upon using this approach came from the IT manager, who is the head of BreathCo's EDP (computing) department, who also provided support examining issues of the project that related to information systems.</p> <p>The models therefore needed to be compared with what was undertaken at phase 2.</p> <ul style="list-style-type: none"> <li>• The researcher learnt that due to the pressures the organisation is under, it would not be feasible to give a talk upon constructing Root Definitions and Conceptual Models that SSM espouses. To force this issue would violate the philosophy of co-operative inquiry.</li> <li>• The individuals of the team learnt that the best way to move the project forward, would be to develop models based on a systems perspective, as well as incorporating the work that had been undertaken already.</li> <li>• The researcher learnt that other models can be argued to incorporate systems thinking, as well as not having to undertake formal root definitions and conceptual models, as the individuals were happier undertaking the process using tools they are more familiar with, such as Visio and Excel.</li> <li>• The researcher also learnt that the formal BreathCo procedures of GREAT, and other problem processes, helped record and monitor the progress of the project.</li> </ul>
C2 P2	Amend planned action steps.	<p>After Christmas of 2003, and the early part of January 2004, the project was looked on from the senior management as an important project, and was given a deadline of being implemented by the end of July 2004. Along with this recognition, the projects title of 'Customer Complaints' was renamed as the 'Customer Concerns Management Project', which was an initiative that came from the general manager himself.</p> <p>The team discussed the final model in greater detail. Participants undertook the comparison in their own time away from meetings. Meetings were used to discuss issues raised and issues of questioning aspects of the models within the 'real world'. Every member of the team was happy that a 'system' that could undertake processes that the model represented, would be a success, even though these were not derived from conceptual models.</p> <p>As the methodology espoused a participatory and co-operative inquiry aspect, it was left to the team to make the feasible changes based on the models developed and compared to the real world. All team members agreed that the next phase was to incorporate the processes identified within an ISA.</p> <p>Action had to be taken to identify an IS solution that would improve the problem situation of customer complaints/concerns.</p> <p>If an IS solution was implemented, it needed to be brought into the organisation. How this would be done therefore, needs to be managed. The SSM<sup>xi</sup> framework does not incorporate these processes.</p> <ul style="list-style-type: none"> <li>• The researcher learnt that the system being designed was based on solving customer complaints, but wondered if the new title of customer concerns, would affect the final system that was implemented.</li> <li>• The researcher learnt that SSM<sup>xi</sup> was helping the participants discuss important issues through tools such as the AIM Venn diagrams and rich pictures. What will happen when the researcher exits the research cycle therefore, needs to be considered?</li> </ul>
Learning Outcomes		

C2 P3	<ul style="list-style-type: none"> <li>• The individuals learnt that the best way to proceed, now the model of a 'system' had been compared, and an ISA was necessary, was to form a smaller team including the researcher, as the previous work that included the other participants was still valuable.</li> <li>• Through the methodology developed for using SSM<sup>2</sup>, it was the team who decided what would be feasible and desirable for themselves and the organisation.</li> <li>• A process for undertaking the IS implementation needed to be found.</li> </ul> <p>This phase is firstly concerned with identifying and liaising with the potential IS developers, or potential software applications, that were explored to be compatible with how the team wanted an ISA.</p> <p>The only formal process discussed for proceeding with the project was the GREAT process.</p> <p>From various options available to the team, it was jointly decided, with support from the EDP manager, to use an IS developer to develop the technology based on Lotus Notes.</p> <p>The development of the ISA took the form of prototyping, where the IS developer would produce the technology for the team to test and feedback the findings.</p> <p>The project manager produced a training manual, based upon the model of the 'system' and an early version of the technology. The training manual that was developed in Microsoft Word was used to create a training presentation on Microsoft Power Point. The Power Point presentation was to be used for the training of other end users.</p> <p>It was suggested that a trial of the training package would be undertaken with a couple of employees from the IT department and human resources (HR). These employees will not directly have to use the IS, but could give feedback on the standard of the training and provide any useful comments.</p> <p>The outcome of this the next phase is firstly, concerned with the roll out of the ISA, which is the envisioned solution to the problem for the organisation. Secondly, this phase requires the training of identified users.</p>
Learning Outcomes	<ul style="list-style-type: none"> <li>• The team learnt that the first part of the research that allowed the problem to be investigated and modelled, provided more insight into how an ISA should be designed and implemented.</li> <li>• The team learnt planning a professional training session was an important part of IS implementation.</li> <li>• The team learnt that how the training would be delivered, and received by the trainees, could affect the eventual 'buy in' and take up of the technology and related to the learning theories identified within the literature.</li> <li>• The researcher learnt that the shared language that was developed earlier in the project, was important when discussing the project with the IS developer.</li> <li>• The researcher learnt that the IS developer could be incorporated into the community of the BreathCo project, and still effectively undertake his job.</li> <li>• It was important for the IS developer to learn the business of BreathCo, but not to dominate the project, even though he was an expert in developing ISA.</li> </ul>
C2 P4	<p>Monitor implementation</p> <p>When the IS developer is not present, a more thorough inspection and testing procedure was underway. This is to check for consistency in the fields, forms, and the aesthetics of the technology. It was noted that the team in undertaking this process could be argued as a community of practice.</p>

	and effects.	<p>The learning theories argued for was valuable in exploring this stage of the project.</p> <p>The team checked the presentation that had been constructed, and were very pleased with what they saw. The ISA that was being implemented was also taking shape in accordance with the model and prototyping approach being used. This was to help with the training of other end users, which was important.</p> <p>A number of trial training sessions were undertaken to help with this testing. The Power Point presentation provided enough detail to the background to the project, as well as demonstrating how to input concerns into the software. The laptops selected for the training however, were causing problems.</p> <p>Using the laptops for the practical aspects, with a formal presentation, seemed the most logical way forward, and was considered as being commensurable with the learning theories identified in the literature. All members of the team seemed to support this approach and were motivated to move the project forward.</p> <ul style="list-style-type: none"> <li>• The team learnt that an ISA could go through many different development cycles, and requires a record of what improvements have to be made.</li> <li>• The team learnt how the Power Point presentation was constructed could have an effect on how the trainees used the ISA.</li> <li>• The team learnt that practicing the whole training session was very important.</li> <li>• The team learnt that the laptops used had to function correctly.</li> </ul> <p>Close contact with the developer was being kept every couple of weeks. Each revision of the technology is discussed with the team, then with the developer, and proposed changes are recommended. It was considered that this technique worked best for all parties, as the team still have to complete other tasks that the company employs them for.</p> <p>When the ISA reached the stage that the team were happy with, this cycle had finished. The IS developer was paid, and the finer points on the ownership and future plan for the technology were discussed, along with if other BreathCo sites wanted to adopt the ISA. These issues are identified as important, and need to be included in any framework that involves teams undertaking a client-led design framework, when implementing ISA within organisations.</p> <p>It is noticed that having a smaller team comprised of key individuals seemed to work well. It would be interesting to see if remaining with the larger team would have produced the same desired outcomes.</p> <p>The only minor problems came from the practice training sessions. The laptops that were used for the participants were very slow in some places, freezing up in other places, and would not always allow the demonstration of transferring concerns from one individual to another. Or in this case, one laptop to another. The problem was that all spare laptops that were available had been issued to the team, so no other laptops were available to be used.</p> <p>Whilst the first phase of the project used SSM<sup>XL</sup>, and the tools used to help focus the project, it is also used to help generate learning activities. This second aspect of the project did not have such a framework or tools, and is argued to create learning activities, but these had to be analysed from the learning theories discussed.</p>
Learning Outcomes		
C2 P5	Evaluate.	
Learning Outcomes		<ul style="list-style-type: none"> <li>• The team learnt that by making recommendations about the ISA, which the IS developer would then go away and implement, before the new ISA could then be tested by the team, was a worthwhile approach to development.</li> <li>• The team learnt that as long as there is a team that is comprised of individuals that can bring many different perspectives to a situation, it does not matter how small a team is. In this case, four individuals, plus the researcher, plus the IS developer worked well.</li> <li>• The team learnt that IT support is required when using a number of computers, that need to be temporarily linked for training purposes and for the actual ISA.</li> </ul>

		<ul style="list-style-type: none"> <li>• The researcher learnt that the problems with the ISA may affect the perception of the technology, and is something that should be monitored during the training and initial use.</li> <li>• The researcher learnt that frameworks drawn on from academia, can provide a team with a better chance of generating learning activities.</li> <li>• Having processes to help a team maintain the implemented ISA is important, and needs to be incorporated in an IS development framework.</li> <li>• No framework has been used during this phase of the project. A framework may be in existence that could be linked with the SSM<sup>2</sup> framework used during the design stage.</li> </ul>
C3 P1	Revise change intervention as necessary.	<p>This phase of the action research cycle relates to training, examining the ISA in use, and evaluating the complete process.</p> <p>In this phase, the final ISA had to be error free and transferred to the BreathCo server. The hardware problem with the laptops had to be resolved before the training commenced.</p> <p>The employees that would get access to the technology were to be identified and placed upon the training course. The number of slides in the presentation was reduced from 150 to 87, to keep to the time scale of one hour for the presentation and questions, followed by the second hour for the practical exercises.</p> <p>How the training programme is designed and given will be important, as it will reflect how the employees perceive the ISA and how they will use it. The data collection method at the training stage would be a questionnaire accompanied by a video of each training session. The data collection method for the evaluation of the project would be semi-structured interviews.</p> <ul style="list-style-type: none"> <li>• The team learnt that a practice training session should have been conducted when the ISA was completely error free.</li> <li>• The team learnt that the selection of individuals to attend the training session would be very important, as well as deciding whether individuals from the same department should be trained together, or the groups should be mixed. This aspect was discussed through the theories of learning reviewed.</li> <li>• The researcher learnt that the principles of learning theories could apply to the training programme and not just to the design and use of the ISA.</li> </ul> <p>The presentation was finally completed and ready for the training session. Liaising with EDP upon the resolving of problems with the laptops was also high on the list of things to do.</p> <p>Other activities included frequent practice training sessions in the old meeting room, and the construction of some practical examples of concerns that trainees can input into the ISA.</p> <p>The ISA that was being implemented had to be replicated, so a training tile could be developed which would be used as part of all training. The training tile created could be used for further practice for participants after their training session had been completed.</p> <p>Formal interviews were designed, so after a period of use, an evaluation of the processes could be undertaken concerning the design, implementation, and use of the ISA with both the development team and other end user participants.</p> <ul style="list-style-type: none"> <li>• The team learnt that it was important to keep a constant dialogue with EDP to get the training technology replicated in line with the live ISA. This could also take account of participants moving in and out of the community, and a good way to explore how learning can be undertaken within an organisation.</li> <li>• The team learnt that the practical examples that were to be produced had to be realistic concerns, and were taken from customers who have had a well-documented concern in the past. The learning theories of social learning and the zone of proximal development were used to help construct the examples. How these examples were presented would also be important.</li> </ul>
Learning Outcomes		
C3 P2	Amend Planned Action Steps	
Learning Outcomes		

C3 P3	Implement planned action.	<ul style="list-style-type: none"> <li>The researcher learnt that the whole training process requires a lot of co-ordination to organise a suitable room and set it up to a professional standard, and processes within a framework may help tackle these issues more effectively and generate further learning activities.</li> </ul> <p>The training list was conducted with help from the HR department, who e-mailed each participant with a date and time for their training session.</p> <p>A training questionnaire was developed to be given out after the training session, along with the HR questionnaire, that is issued with any form of training within BreathCo.</p> <p>The room for the training was booked and a video camera was borrowed, which was set up out of the way in the corner of the room. This was designed to capture dialogue between trainees and trainers for use on the expanded DISCOUNT scheme (see Small and Irvine, 2006). Training began over a period of one week in early July 2004.</p> <p>Analysis from the administered questionnaire was fed back to the team.</p> <p>The semi-structured interviews were also being constructed for the final aspect of the research with users and non-users of the ISA.</p> <p>The final interviews were conducted during December 2004 and January 2005. Fifteen participants were interviewed in total for this final aspect of the research.</p>
Learning Outcomes		<ul style="list-style-type: none"> <li>The team learnt that where the training was conducted was important, as it needed to be able to hold the trainees, trainers, and all the technology equipment, but at the same time be comfortable so what was being presented would be understood.</li> <li>The researcher learnt that the human resource department was an important department, as it acted like a gate to formally invite trainees to the course. The researcher learnt that trying to use the videos to capture dialogue was limited.</li> <li>The researcher learnt it was difficult to use the expanded DISCOUNT scheme developed to identify learning activities in the BreathCo case.</li> </ul>
C3 P4	Monitor implementation and effects.	<p>Due to some commitments of the trainees, some sessions had fewer individuals than others, but this did not detract from the usefulness of the ISA. The training team took in turns to deliver the first session of the training, whilst all trainers supervised the practical aspects of the course in the second hour.</p> <p>All participants were informed that the session would be videoed recorded, and could object to their session being recorded. Only one individual in one group objected, so that session was not videoed. By the end of the week, the sessions flowed a lot better than the earlier ones due to the trainers having more practice and confidence.</p> <p>The room lay out seemed to work with each individual sat behind a laptop, with the presentation being given by the trainer who was stood in front of the whiteboard, so each participant could see the presentation and compare it to the laptop screen.</p> <p>From the feedback received, participants seemed pleased with the way the training programme was implemented as well as the ISA itself.</p> <p>It is argued that that the learning theories proposed can be investigated in action.</p> <p>Participants were happy to be interviewed to explain their reasons, feelings, and issues with using, or not using the concerns technology now that it had been implemented and in use for a period of time.</p>

		<p>On searching the concern logs, it could be seen that more and more concerns were being logged by more and more individuals. It could be argued that the technology was a success, as concerns that may not previously have been recorded are now being recorded. It is from these concerns that BreathCo hopes to further learn about its business and problems that need to be corrected.</p> <ul style="list-style-type: none"> <li>• The team learnt that by sharing the responsibility of presenting the presentation for a non-product and product concern would keep the trainees engaged.</li> <li>• The researcher learnt that the cancellations and no shows may be linked to an element of culture within the organisation, as a formal reason why was required.</li> <li>• Participants interviewed for the final aspect of the research were happy to contribute and provide their comments.</li> </ul>
Learning Outcomes		
C3 P5	Evaluate.	<p>The physical design of the CCM technology was complete. The application had now been implemented by the team and developed by a software developer, with heavy consultation from the team. The training package had been designed and had been delivered.</p> <p>Problems occurred in using the videos to compile dialogue exchanges, as picking up who said what was difficult.</p> <p>The trainees had mixed reactions upon seeing the new ISA, and the reasons why the 'system' had been designed. Problems were identified to stem from the language of 'ownership' and 'responsibility', as well identifying what a concern was.</p> <p>The final interviews also provided the project team with some insight into the use of the ISA.</p> <p>The ISA implemented within this case was considered successful by some participants, but provided problems for other participants.</p> <p>It is argued that the SSM<sup>XL</sup> framework used provided value in designing an IS around a vague problem situation. Further issue however, relating to the implementation of the technology that needed to be considered if further learning activities are to be generated. The learning theories helped search where learning may be undertaken and where learning opportunities were being missed.</p> <p>The language problems drawn out, were supposed to be discussed during the early phases of the framework, which were identified as applicable by the participants. Once the technology was implemented, this issue still seemed to not have been resolved. These issues therefore, were brought out in the analysis.</p> <p>The expanded DISCOUNT scheme was designed to be used to identify learning organization conditions in practice. Through a majority of the project however, this was not able to be undertaken. Even though this posed a problem, it is argued that the learning theories proposed did offer value in identifying where learning activities were being undertaken, even if there was now no formal way to measure these. This contributed to the overall research process.</p> <ul style="list-style-type: none"> <li>• The team learnt that the difficulties with the laptops might have been down to the laptops not being upgraded, which EDP did not reveal until after the training. A process therefore, of capturing problems when implementing ISA needs to be used.</li> <li>• The researcher learnt that through the many differing perspectives that individuals have within their jobs, the advantages that the technology would give to each individual might be very different. It is this difference that would need to be explored. There may also be a cultural element involved.</li> <li>• The researcher learnt that even though the project was formally led by users of the technology, not all participants were using the ISA.</li> <li>• A second framework identified from reflecting on the outcomes of the BreathCo case needs to be joined with SSM<sup>XL</sup>.</li> <li>• The complete SSM<sup>XL</sup> framework needs to be further developed and re-tested in a second case.</li> </ul>
Learning Outcomes		

Cycle And Phase Numbers	Description Of Phase	The HealthCo Project: The Investigation of the Starter and Leaver Process and the Implementation of Smart Cards (Re-Testing the SSM <sup>XLTM</sup> Framework)
C1 P1	Initial idea and criteria for change intervention.	<p>From the outcomes of the BreathCo case, the area of technology management, and in particular a technology management process framework (TMPF) was perceived as a process that can help participants within an IS project. Can SSM<sup>XLTM</sup> therefore, be used to help design, implement and manage an IS project as well as generate learning activities?</p> <p>Other ideas that need to be considered included how can the limitations of the early phases of SSM<sup>XLTM</sup> highlighted in the BreathCo case be overcome?</p> <p>Initial contact with the project leader came in November 2004. The project leader acknowledged the use of SSM, but believes the approach is too complex.</p> <p>Through discussing the research and outcomes of the BreathCo case, a project was identified as being both suitable for the research and for the participants of HealthCo. The project was the smart card project.</p> <p>Access was obtained through the project leader with a list of possible participants to contact. A desk was set aside within HealthCoF for the researcher to work from, whenever it was convenient. The workforce planning manager was the key informant based at HealthCoF.</p> <ul style="list-style-type: none"> <li>• The project leader is aware of the principles of SSM.</li> <li>• SSM was stated by the project leader as suitable but too complex.</li> <li>• The proposal of trying to create learning organization conditions was received positively, but it was doubted would work in practice, especially in HealthCo.</li> </ul>
Learning Outcomes		
C1 P2	Reconnaissance (fact-finding and analysis).	<p>Through being allowed a desk, reconnaissance and fact finding was made simple, as participants could be contacted and observations easily recorded.</p> <p>Participants allowed the researcher to sit with them whilst they explained their role, and their roles relation to starters/leavers and the smart card project. The problems participants face was recorded, along with their thoughts on the smart card in general, and how it may affect their role.</p> <p>The NPFIT web site did not give much information about the project; neither did many participants have any concrete knowledge of the project, only that it will happen soon.</p> <ul style="list-style-type: none"> <li>• Participants had a perspective of their work and how it might be affected, but were unaware of the specifics of the smart card project.</li> <li>• Participants only considered what their department undertook, and were unaware of other department's requirements in order to function, and how they all interact.</li> <li>• The use of SSM<sup>XLTM</sup> is argued to add value in helping participants see a variety of different perspectives, if they can be communicated effectively, or brought together.</li> </ul>
Learning Outcomes		
C1 P3	Plan action steps for the intervention.	<p>The project of investigating the starter/leaver process, in relation to the smart card implementation, was deemed straightforward. It was decided therefore, to adopt a process of data gathering from unstructured interviews. If participants could not answer a question, a plan to find out who would know was drawn up. This individual will then be contacted to see if they would like to participate in the study.</p> <p>From participants that would like to participate; an informal interview would be conducted, and recorded.</p>

	<p>Observations will be taken on what other processes were identified and how they may relate.</p> <p>The methods of interviews, observations, and the appreciative inquiry method's (AIM) Venn diagrams were the techniques designed to be used.</p> <p>The outcomes will be written up in a report that focuses on the outcomes the participants wanted to know about, as well as trying to draw out other issues that could be used to enact learning organization conditions.</p> <p>The discussions will be recorded in an attempt to see if learning organization conditions have been created or hindered.</p> <p>The SSM<sup>XLTM</sup> framework has to be used in a 'mode 2' perspective, similar to the way the BreathCo case turned out, as the project leader was happy to use ideas from academia but did not really want to allow a workshop to explain the approach.</p> <ul style="list-style-type: none"> <li>• Structured projects require more thought on data collection methods as participants may not be able to elaborate on issues, if they believe they are deemed unnecessary.</li> <li>• Some methods may not be able to be developed, or participants may not seem keen to use them, if the project is not perceived to benefit them or have an affect on their work.</li> <li>• The methodology of participatory action research (PAR) and co-operative inquiry (CI) may not be able to be undertaken, due to the wishes of the project leader and other participants, who state the project is straightforward and do not require high elements of participation.</li> </ul> <p>Participants were contacted and happy to talk about their job role and record the processes that are being undertaken.</p> <p>Participants were happy to state issues with starter and leaver processes, but were not so aware of how the smart card project would affect them. Key informants were identified who had knowledge on how the smart card will affect HealthCo.</p> <p>Documents were collected on current processes such as obtaining a current ID badge.</p> <p>The main methods of interviews and observations were used.</p> <p>The AIM Venn diagrams were attempted, but the statements posed were too structured and therefore, participants had difficulty in completing them.</p> <p>From the interviews transcribed, the first two phases of SSM<sup>XLTM</sup> were undertaken, and it was hoped that model building would be undertaken with participants of the project. Informal chats with the project leader implied that the researcher needed to undertake the modelling aspects.</p> <p>From the data collected, CATWOE's, root definitions, and conceptual models were developed to help investigate what action may be taken to improve the problem situation.</p>
Learning Outcomes	<ul style="list-style-type: none"> <li>• The SSM<sup>XLTM</sup> framework helped the researcher structure the problem situation, as well as not get side tracked only addressing starter and leaver processes that the project leader was primarily interested in.</li> <li>• Through the researcher using SSM<sup>XLTM</sup>, the stages were able to be undertaken more smoothly and in a timely manner, as a participative approach was being undertaken without the co-operative element.</li> <li>• Participants contacted were happy to participate.</li> <li>• Further tools need to be developed to help structure a structured problem situation, so further insights can be drawn out.</li> </ul>
C1 P4	<p>Implement planned action steps.</p>
Learning Outcomes	<ul style="list-style-type: none"> <li>• The SSM<sup>XLTM</sup> framework helped the researcher structure the problem situation, as well as not get side tracked only addressing starter and leaver processes that the project leader was primarily interested in.</li> <li>• Through the researcher using SSM<sup>XLTM</sup>, the stages were able to be undertaken more smoothly and in a timely manner, as a participative approach was being undertaken without the co-operative element.</li> <li>• Participants contacted were happy to participate.</li> <li>• Further tools need to be developed to help structure a structured problem situation, so further insights can be drawn out.</li> </ul>



		<ul style="list-style-type: none"> <li>• The project was primarily being conducted by the researcher so therefore, any biases need to be highlighted to participants, so proper conclusions can be drawn from the data captured.</li> <li>• Projects that offer managers of organisations the chance to use theories from academia are more concerned with the action and outcomes of projects then with the research aspect.</li> </ul>
C1 P5	Monitor implementation and effects.	<p>Whilst the processes involved in modelling the systems models helped focus the problem, it was believed that it may be confusing to participants as no time was made available to discuss SSM<sup>XLTM</sup> formally, and how to construct root definitions, CATWOE's and conceptual models.</p> <p>A software package called IDEFO was used to show the transformation processes of current practices, and how these may be altered, depending on the choices that will need to be taken to improve the problem situation.</p> <p>The report was presented informally to the project leader. He seemed happy with the work and modelling that was undertaken, and the recommendations made.</p> <p>The project leader stated the report would be copied and circulated to other members of the team</p> <p>Other participants stated the report was excellent with the models helping communicate a variety of information.</p> <p>There was a mixed response to whether individuals thinking had been altered, due to the outcomes of the report.</p> <p>It was at this point that the discussions on the outcomes of the report would be discussed and needed to be captured. This was posed to the project leader who agreed that the researcher could sit in on the meetings and record the outcomes. This would need to be planned, once all members of the team had a chance to read the report.</p> <p>It was at this point that NPfIT suspended all smart card projects in all NHS hospitals.</p> <ul style="list-style-type: none"> <li>• The IDEFO tool was useful in presenting the findings of the systems models.</li> <li>• Models developed by researchers on behalf of participants could alter and challenge participants' mental models.</li> <li>• Using tools and techniques from formal SSM, helped the researcher whilst other 'systems' perspectives can help participants.</li> </ul>
C1 P6	Evaluate.	<p>Undertaking SSM<sup>XLTM</sup> with only an emphasis on participatory action research, without co-operative inquiry, has to be undertaken in more of a 'mode 2' perspective.</p> <p>Undertaking SSM<sup>XLTM</sup> with only an emphasis on participatory action research, without co-operative inquiry, allows the stages to be undertaken more smoothly and quickly.</p> <p>Without the co-operative elements, it is unknown what other data has been missed that would have altered the thinking of the researcher and the other participants.</p> <p>It is believed that whilst organisations may find value in using theories from academia, time is not set aside for learning about and using such techniques.</p> <p>Whilst SSM<sup>XLTM</sup> is argued as a good approach to tackle unstructured problem situations, and try and enact learning organization conditions, a simpler process</p>

Learning Outcomes		<p>may be required for participants to try and devote more time to learning about the approach.</p> <ul style="list-style-type: none"> <li>• The researcher has learnt that encompassing learning organization conditions within a framework can add value to generating such conditions.</li> <li>• The researcher learnt that whilst methodologies are developed to try and maintain rigour and relevance, within a social setting, undertaking such an approach is a problem in itself.</li> <li>• The researcher learnt that the amount of participation that can be obtained, relates to the individuals and the organisations themselves. Even if senior managers want individuals to participate, and are encouraged to do so, it does not guarantee participation.</li> <li>• The researcher learnt that using SSM<sup>XLTM</sup> can generate learning activities even if these cannot be measured.</li> </ul>
C2 P1	Revise change intervention as necessary.	<p>As SSM<sup>XLTM</sup> could not be fully re-tested, a process of investigating the applicability of the adopted technology management process framework (TMPF), and its use in generating learning activities for undertaking IS management will be undertaken.</p> <p>This will represent the final aspect of the primary research for this study.</p> <ul style="list-style-type: none"> <li>• The researcher learnt that action research can be planned, but once in the research arena, these plans may need to be modified.</li> <li>• Through undertaking a thorough literature review, and a clear concept of the research aims, the research could still be completed suitably.</li> </ul>
Learning Outcomes		<p>The project leader helped identify a number of potential participants who would have interesting opinions and perspectives of technology management within HealthCo.</p> <p>Two participants who contributed in exploring the problem situation, and three new participants, were identified as being suitable.</p> <p>The participants will be interviewed in relation to aspects of technology management within HealthCo, and the investigation of the smart card project. From the outcomes of the interviews, the responses could be compared to the adopted technology management process framework with theories about the suitability of SSM<sup>XLTM</sup> being used in other projects.</p>
C2 P2	Amend planned action steps.	<p>All interviews were to be recorded and then transcribed.</p> <ul style="list-style-type: none"> <li>• If a number of suitable methods have been developed with an overall methodology, any required amended plans made, may still contribute to improving the research process.</li> <li>• Key informants are useful if research plans have to be altered. These individuals were found to offer help, advice, and are prepared to participate in helping the researcher complete the study successfully.</li> </ul>
Learning Outcomes		<p>All participants contacted agreed to be interviewed.</p> <p>The interviews were arranged on different days in the month of September 2005.</p> <p>The interviews comprised a number of themes, and topics, relating to the aspects highlighted as being important for technology management, and the SSM<sup>XLTM</sup> framework adopted for this study.</p>
C2 P3	Implement planned action.	<p>All interviews were recorded and transcribed.</p> <ul style="list-style-type: none"> <li>• The participants learnt that technology management can take many forms and comprise many issues.</li> <li>• The researcher learnt that the participants posed many different perspectives that represented issues relating to their role within HealthCo.</li> </ul>
Learning Outcomes		

C2 P4	Monitor implementation and effects.	<p>Whilst IS management can take many forms, there seems to be a number of processes that need to be undertaken.</p> <p>With NPFIT, more projects are implemented from a top-down perspective, which was stated as being inadequate.</p> <p>In some cases, ISA can be implemented from the bottom-up, which is argued where the most use will come from SSM<sup>XLT</sup>. These particular projects incorporate participation from potential users, and other individuals that the technology will affect.</p> <p>Individuals have to write a business case for requesting and justifying an ISA. It is argued however, that SSM<sup>XLT</sup> can add value in undertaking such a process.</p> <p>On discussing identification, selection, acquisition, exploitation, protection and evaluation issues, all participants could state aspects that are undertaken. These issues highlight that the processes are being undertaken and therefore, can effectively be managed.</p> <ul style="list-style-type: none"> <li>• Participants stated that ISA need to be implemented in conjunction with participants who will be affected by the ISA.</li> <li>• Whilst a business case is required to request and justify an IS, tools and techniques from the SSM<sup>XLT</sup> framework could be used to help write a case.</li> <li>• The researcher has not been able to investigate the change of philosophy, from moving from the soft to the hard more structured issues, involved in design to implementation of IS. How successful therefore, SSM<sup>XLT</sup> is needs further cases to re-test it on.</li> </ul>
Learning Outcomes		Both cases provided insight and contributed to the refinements of an approach to incorporate a learning approach into a soft methodology for the design, implementation, and management an ISA.
C2 P5	Evaluate.	<p>The SSM<sup>XLT</sup> framework proposed is argued to be effective for teams designing, implementing, and managing an ISA.</p> <p>The SSM<sup>XLT</sup> framework is argued to generate learning activities through the processes the framework incorporates.</p> <p>A case is sought where SSM<sup>XLT</sup> can be undertaken. Participants need to fully collect, develop models and identify, select, acquire, exploit and protect and evaluate the ISA so a better insight into the framework can be achieved.</p>

## Appendix D – Contact Summary Sheet and Document Summary Form

### Contact Summary Sheet

Contact Type: BreathCo. On Site Visit	Date: 14 <sup>th</sup> Jan 2005
Where Did the Contact Take Place: Quality Office	Length: 50 Mins
Who Was Interviewed: Product Performance Manager	Summary Number: 17
<p><b><u>What were the main issues or themes that struck you in the contact?</u></b></p> <p>The product performance manager was aware early on in 2004 about the project and his feelings were positive.</p> <p>The project was renamed (Customer Concerns) to avoid the negative connotations that complaint has.</p> <p>The company receives more concerns then complaints.</p> <p>Personally, the product performance manager does not feel the change in title affected perception, but across the company, he feels it would have.</p> <p>This change was used to try and focus it as everybody's responsibility and not just one person.</p> <p>The product performance manager stated he was unsure how other projects have been run compared to this one but believes this project has run very well.</p> <p>The product performance manager's only real problems related to consistency of headings within the models and on the actual system.</p> <p>The product performance manager cannot be specific but considers the developer provided some input into the design of the technology.</p> <p>The training was stated to go very well.</p> <p>Each department that deals with concerns should do their own monitoring so they can raise PSPs where appropriate.</p> <p>The success of the concerns technology relates to training and how it was communicated.</p> <p>The product performance manager believes a review of the technology should be undertaken but not a review of the usefulness of the technology, as he considers it will be useful for a very long time.</p> <p>The product performance manager argues the technology gives BreathCo a lot more then the technology being developed in Germany.</p> <p>Storyboards are developed from PSP.</p> <p>Action lists are part of GREAT.</p>	
<p><b><u>Summarise the information you got (or failed to get) on each of the target questions you had for this contact</u></b></p>	
<u>Question</u>	<u>Information</u>

**Anything else that stuck you as salient, interesting, illuminating, or important in this contact?**

Other people can view the product performance managers own 'systems' even though they are limited, but he believes people are not interested.

As these 'systems' are still running the product performance manager is entering the same data three times.

The project team was selected through individuals who deal with concerns currently. The technology vendor was selected through their track record and designing another technology for BreathCo.

The product performance manager considers the smaller the team is the better the team is.

The models were developed through what the product performance manager uses on customer concerns that was previously a manual 'system'.

The concern codes related to defining current concerns and looking to develop new codes as new products become available.

The language was developed through 'quality systems'.

Senior management may have had the 'system' too complex or less complex then the 'system' that was implemented.

The product performance manager thinks he should not be getting involved with the 'soft' concerns.

The product performance manager believes concerns are followed up.

The product performance manager considers EDP should have provided more support than they did.

Good information is being collected internally but due to sales not having the technology it has reduced the chance to collect more data from the field.

**What new (or remaining) target questions do you have in considering the next contact with this site?**

Not applicable as this is the final round of data collection.

Figure D.1

*A Contact Summary Sheet*

Adapted From Miles and Huberman (1994 P53)

**Document Summary Form**

Site: **HealthCoF**

Number of other documents collected: 1

Name or description of document: **ID badge authorisation form**

Event or contact, if any, with which document is associated: Start process to look at collecting information that is required to complete analysis of smart card project.

Significance or importance of document: **Unknown**

Brief summary of contents:

**Sheet that has to be completed by personnel (I think) to allow the named individual to get an ID badge from Porter Services. This one is yellow and the one I was issued with is white. The layout is also different. I wonder if this is important?**

If document is central or crucial to a particular contact (e.g. a meeting agenda, newspaper clipping discussed in an interview), make a copy and include with write-up. Otherwise, put in document file.

**Could be important. Need to find out more.**

Figure D.2

*A Document Summary Form*

Adapted From Miles and Huberman (1994 P55)

## Appendix E – The Original ATLAS.ti Networks

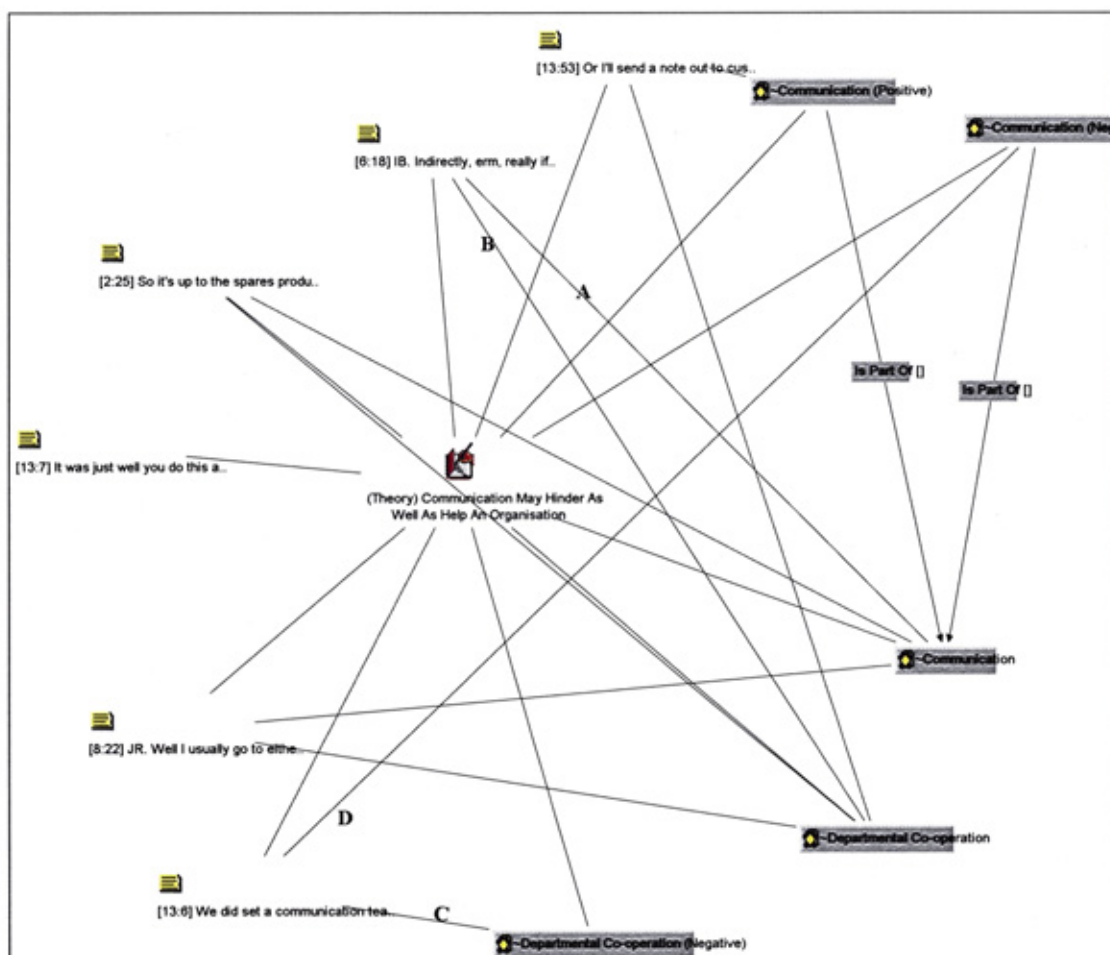


Figure E.1

*The Original Network for Figure 7.1 A Theory Relating to Communication within BreathCo*

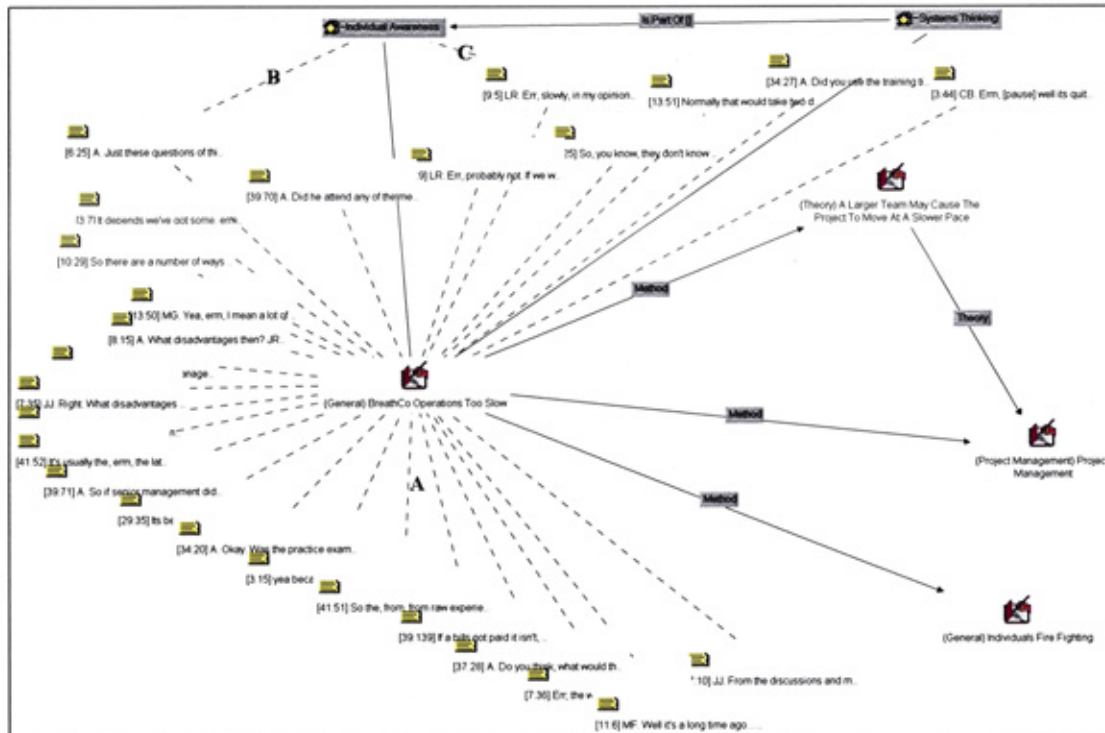


Figure E.2

*The Original Network for Figure 7.2 BreathCo's Operations are too Slow*

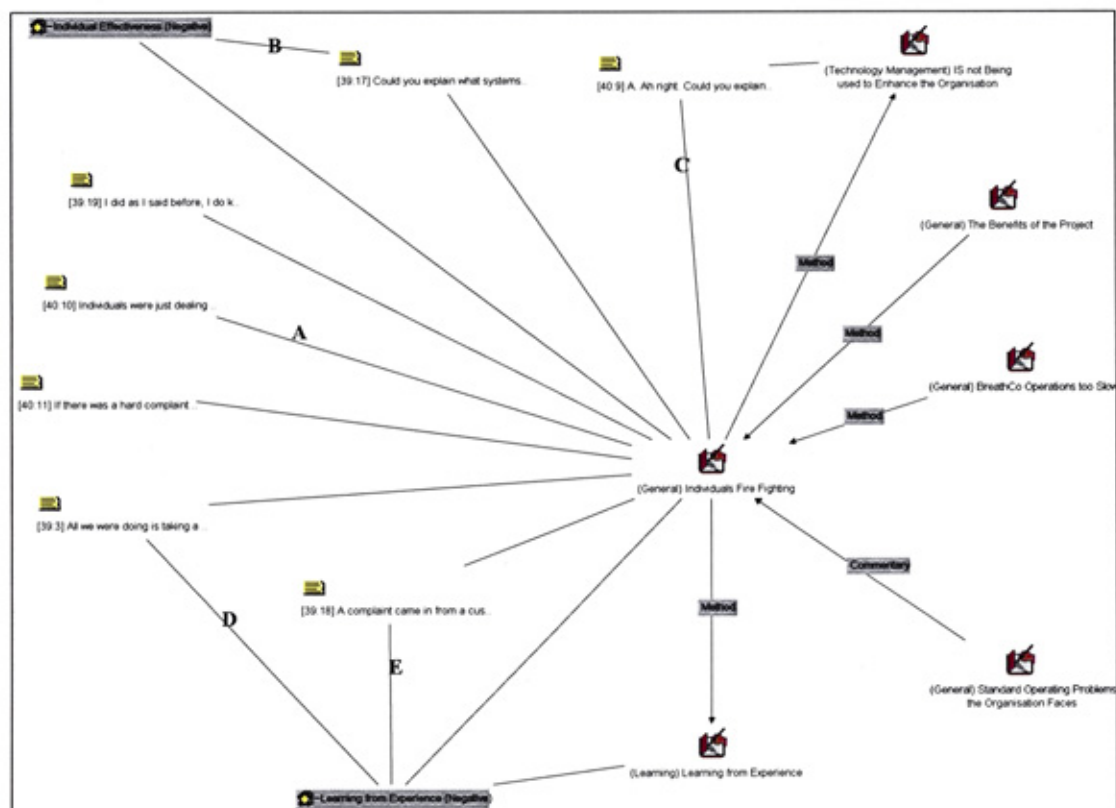


Figure E.3

*The Original Network for Figure 7.3 Individuals Having to Fire Fight*



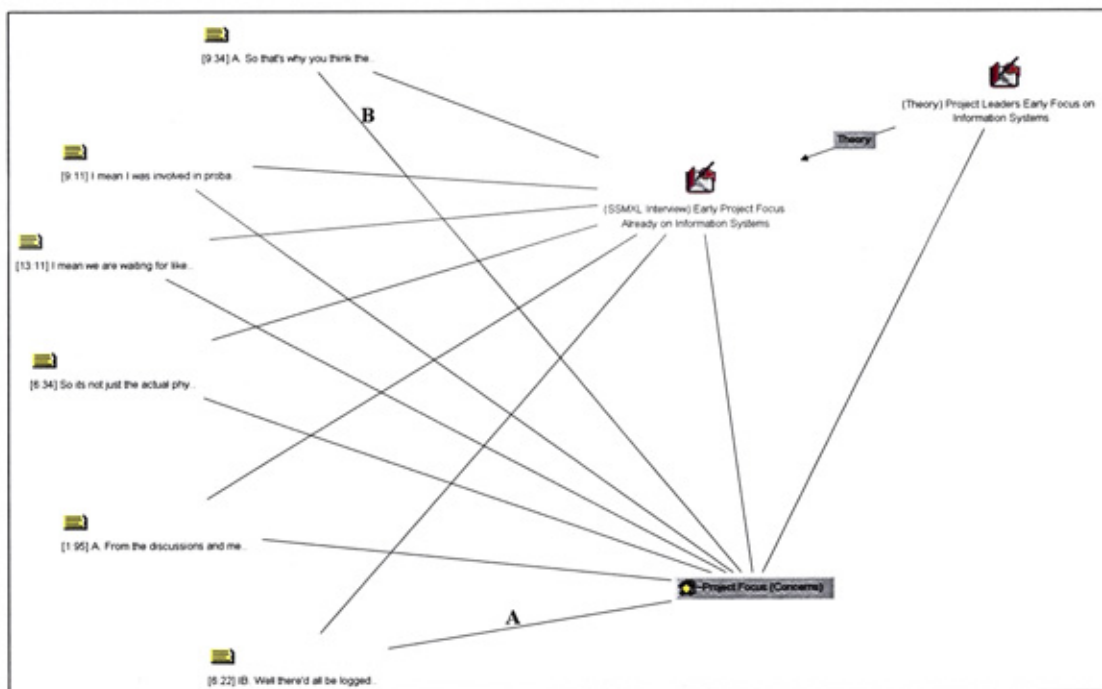


Figure E.4

*The Original Network for Figure 7.4 Early Focus upon Information System Solutions*

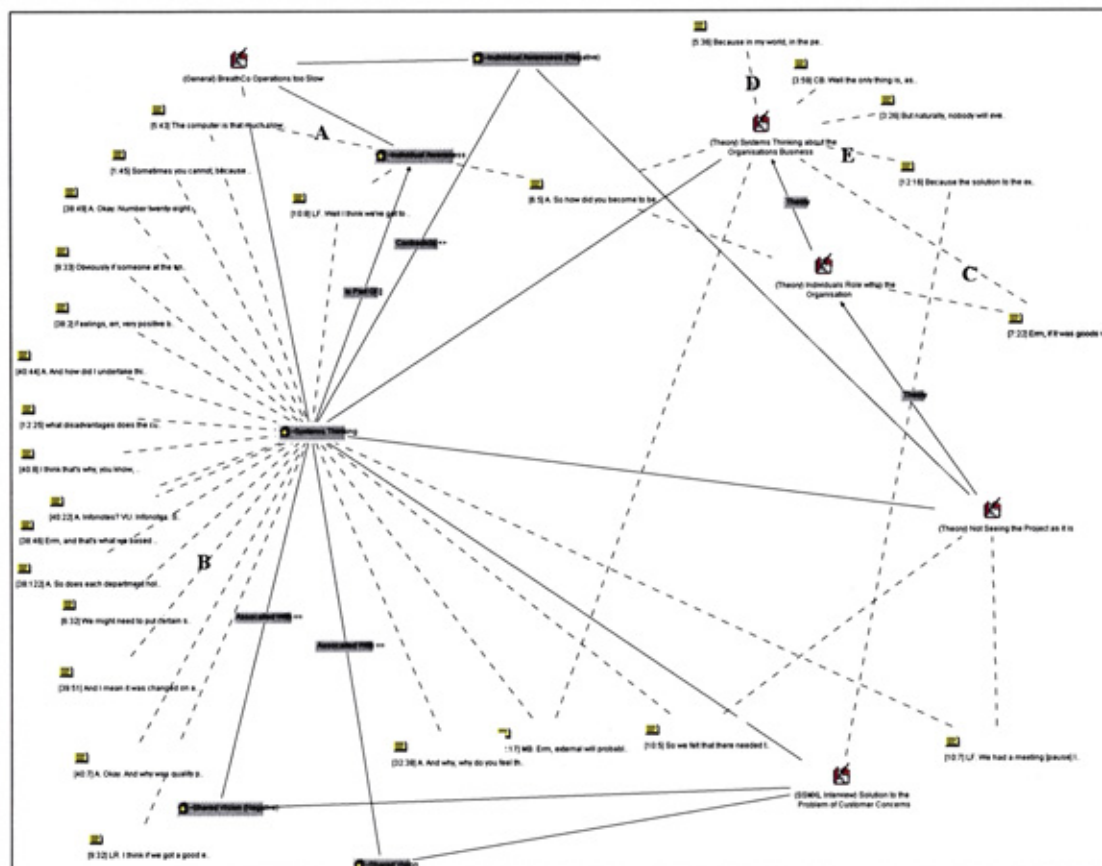


Figure E.5

*The Original Network for Figure 7.5 Systems Thinking within BreathCo*

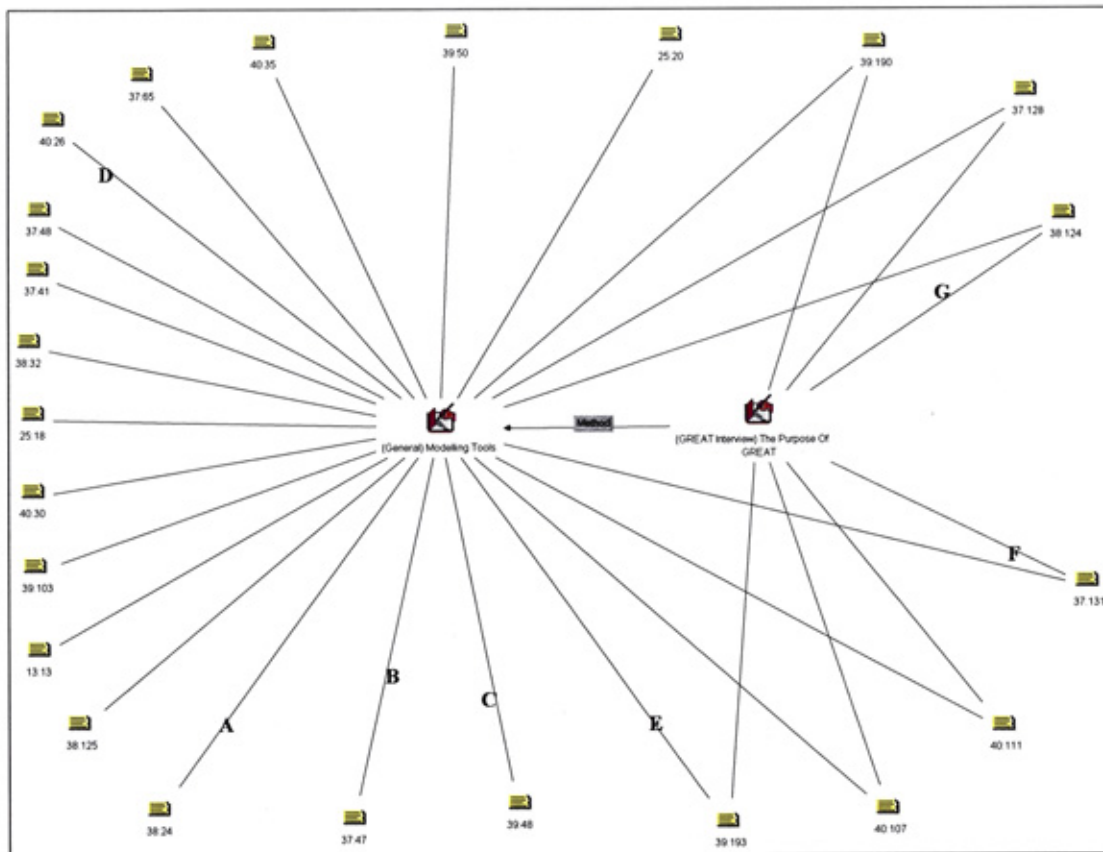


Figure E.6

*The Original Network for Figure 7.6 Modelling Tools Used to Create the Project Design Models*

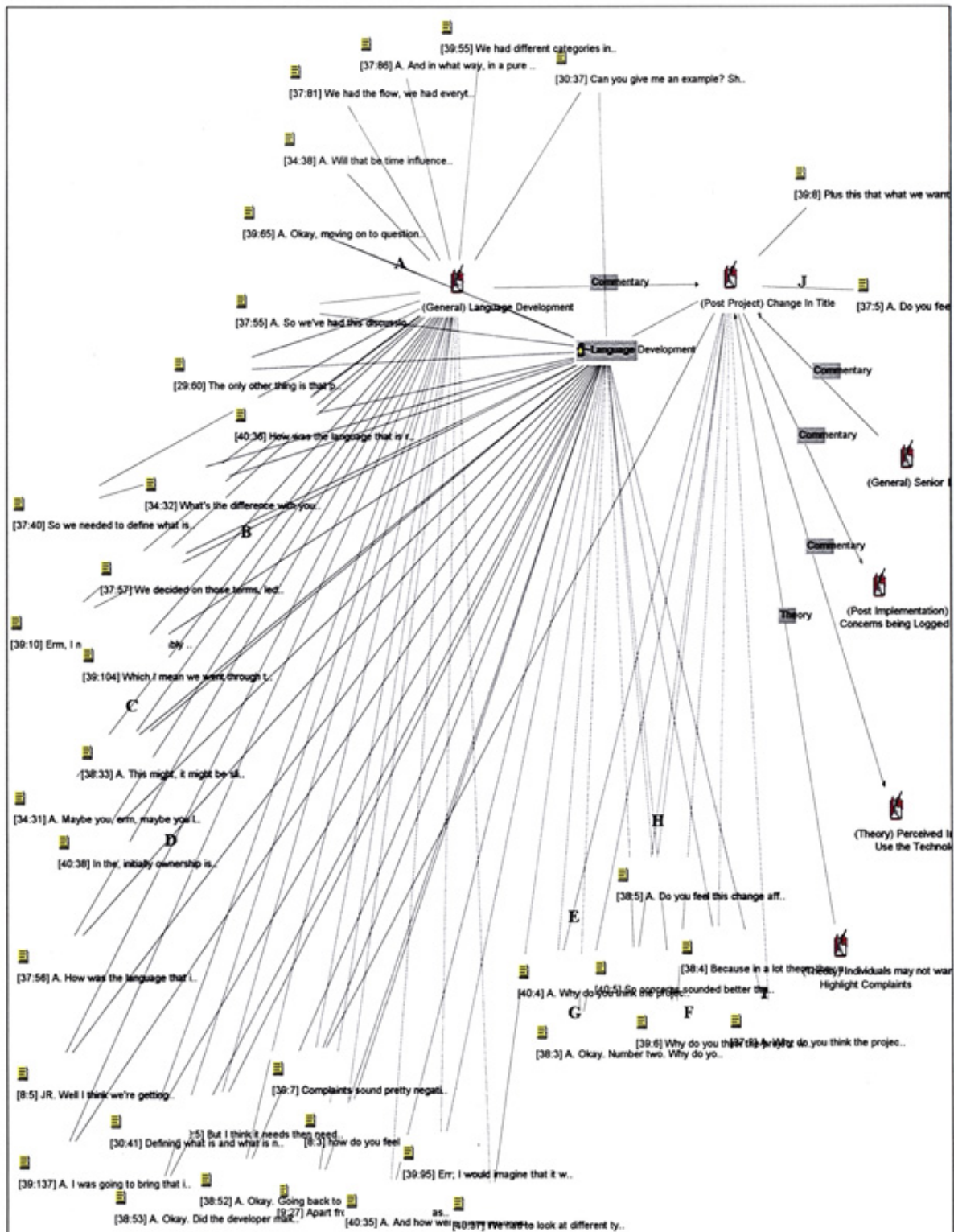


Figure E.7  
The Original Network for Figure 7.7 Further Language Development

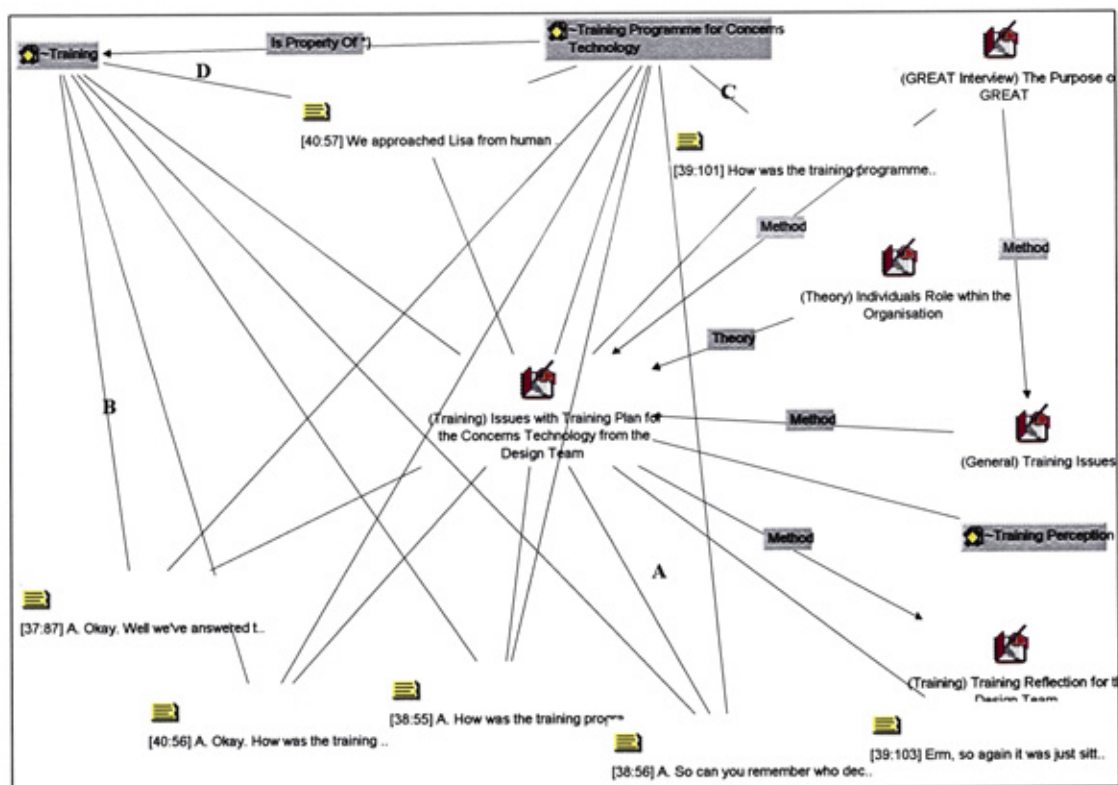


Figure E.8

*The Original Network for Figure 8.1 Developing the Training Plan*

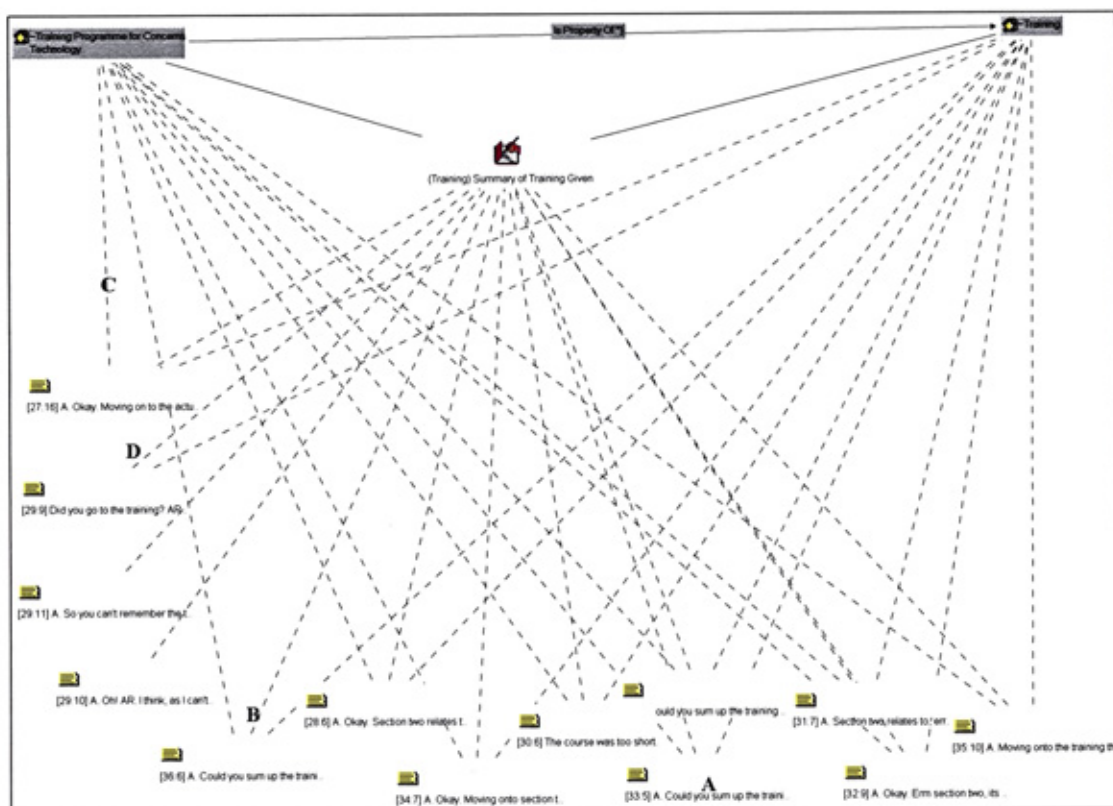


Figure E.9

*The Original Network for Figure 8.2 Summary of Training Given from the Trainees*



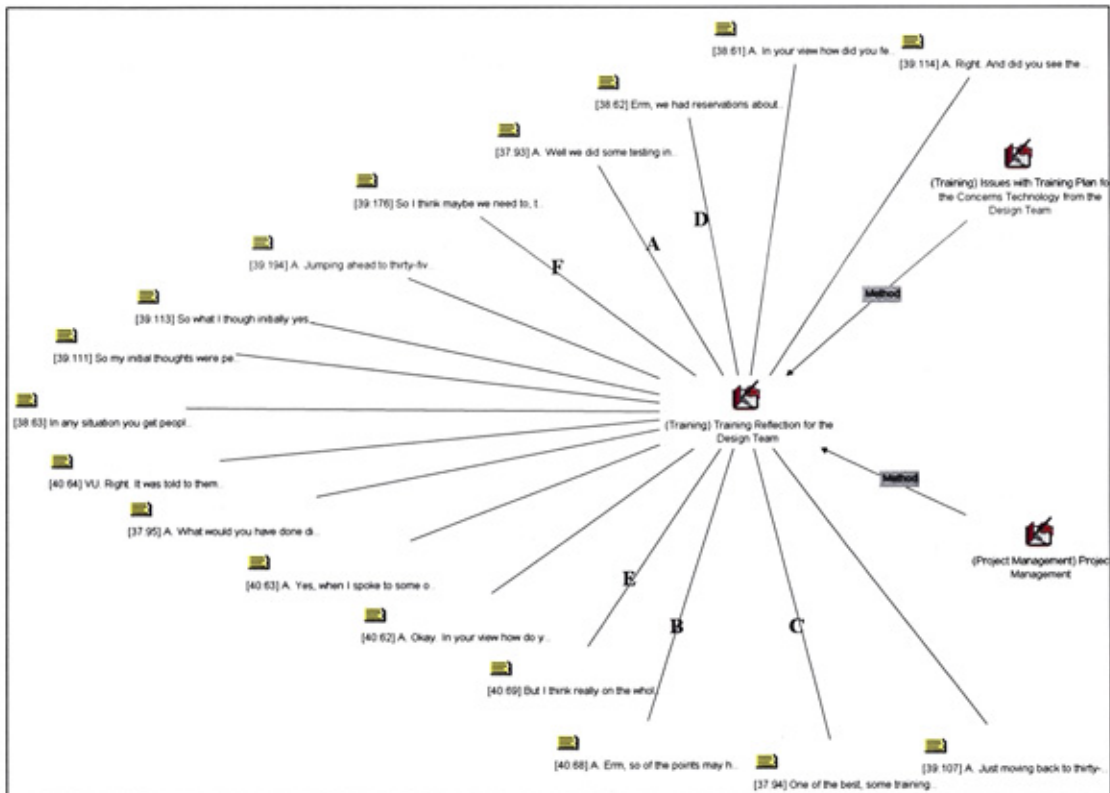


Figure E.10  
The Original Network for Figure 8.3 Reflections from the Trainers

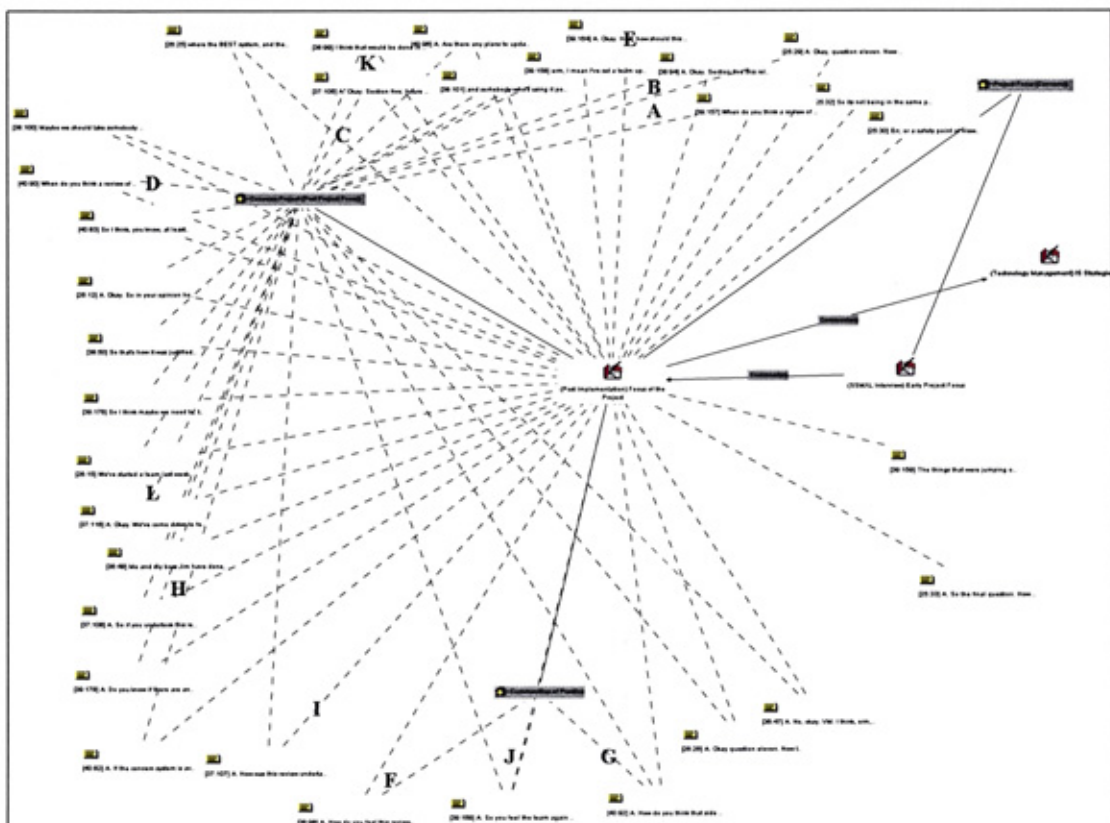


Figure E.11  
The Original Network for Figure 8.5 Exploring the Future Management of the  
Concerns Technology

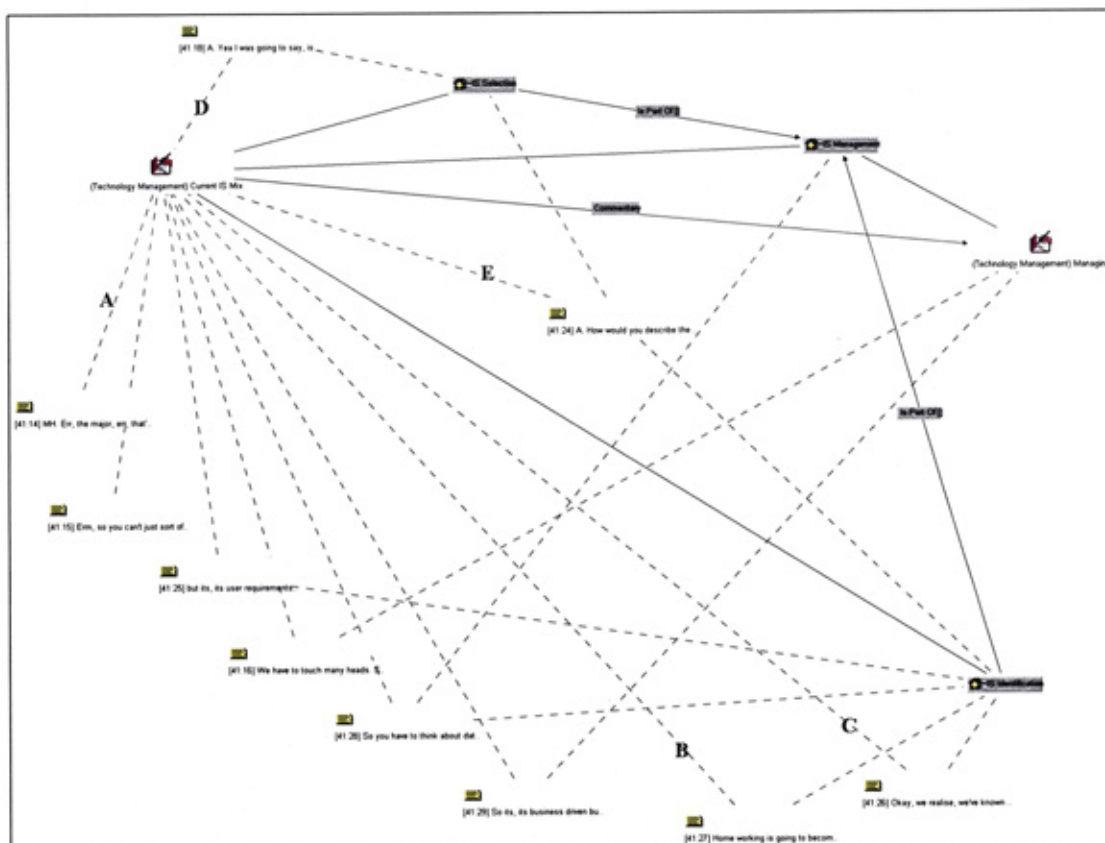


Figure E.12

*The Original Network for Figure 8.7 BreathCo's Information Systems Mix*

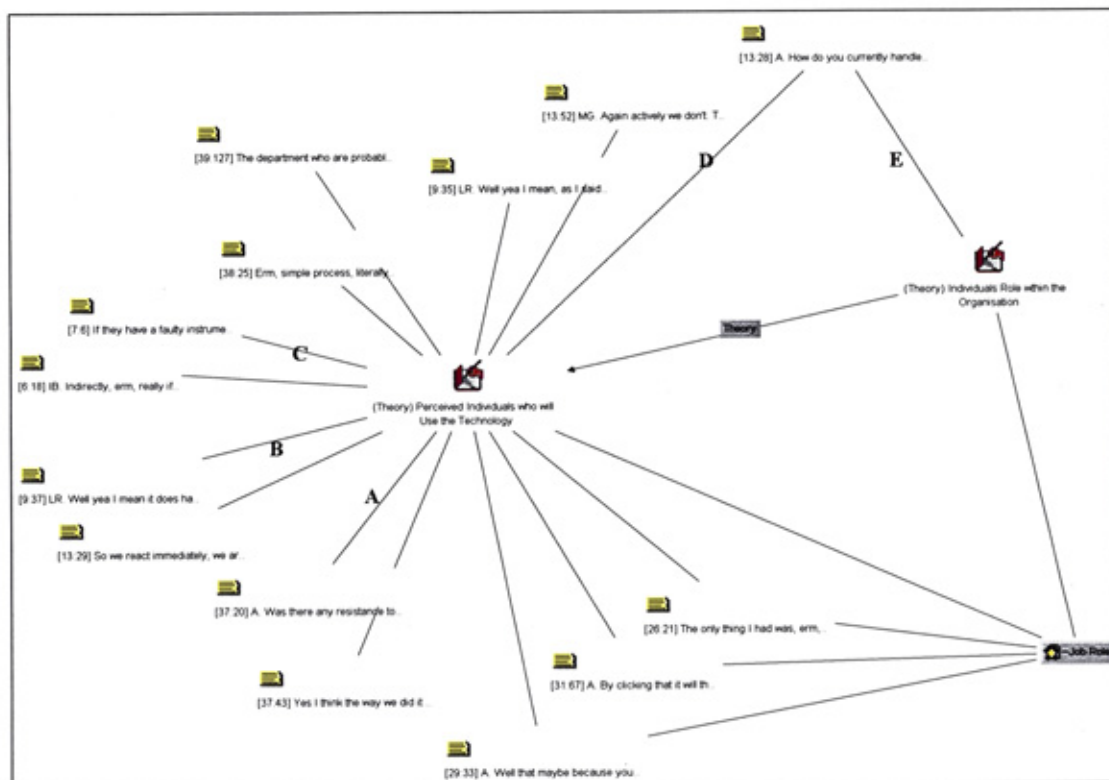


Figure E.13

*The Original Network for Appendix J, Figure J.2 Theory Relating to the Level of Technology Usage*

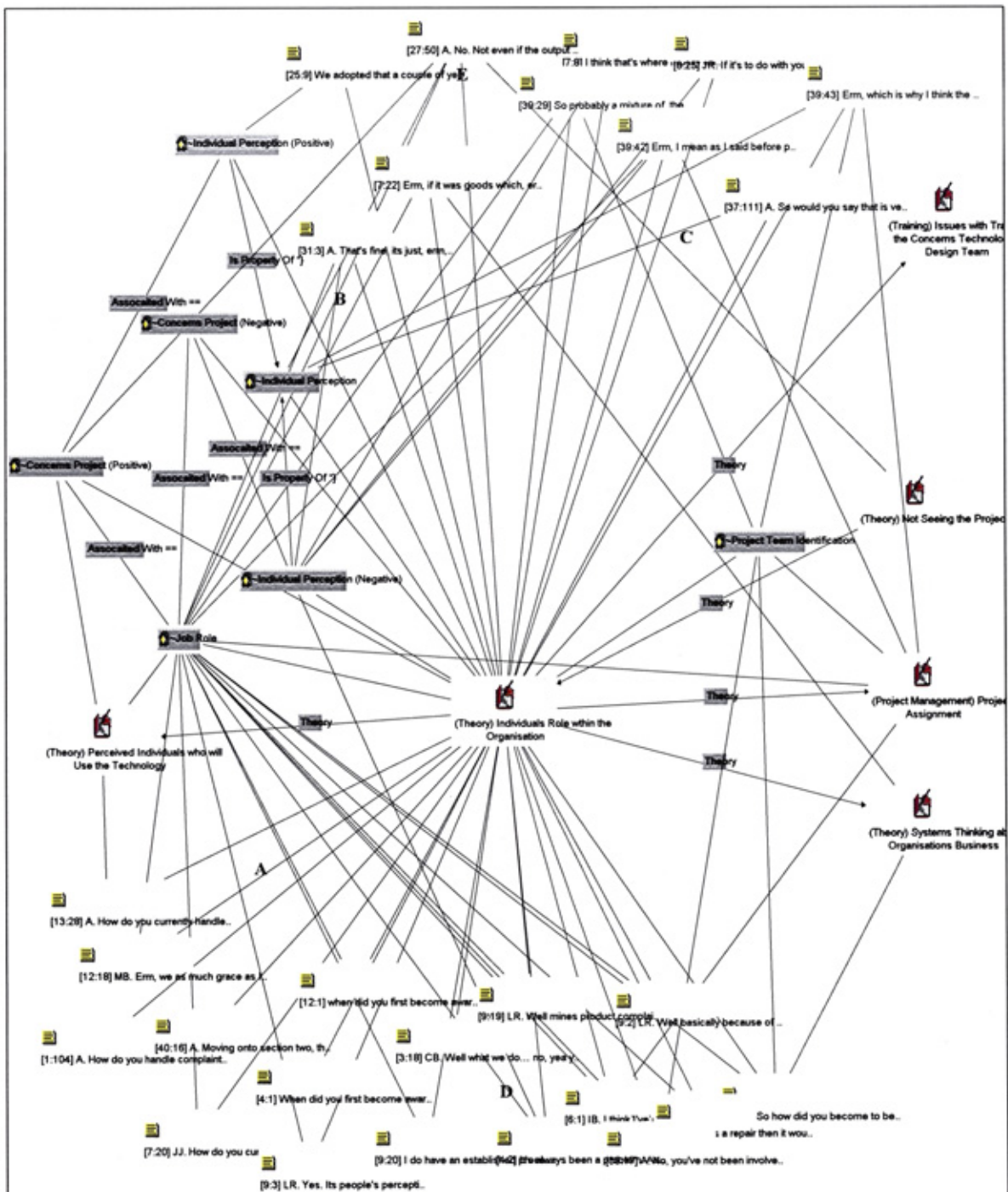


Figure E.14

*The Original Network for Appendix J, Figure J.3 A Network Exploring an Individuals Role within the Organisation and How they could Perceive the Information Systems Application*



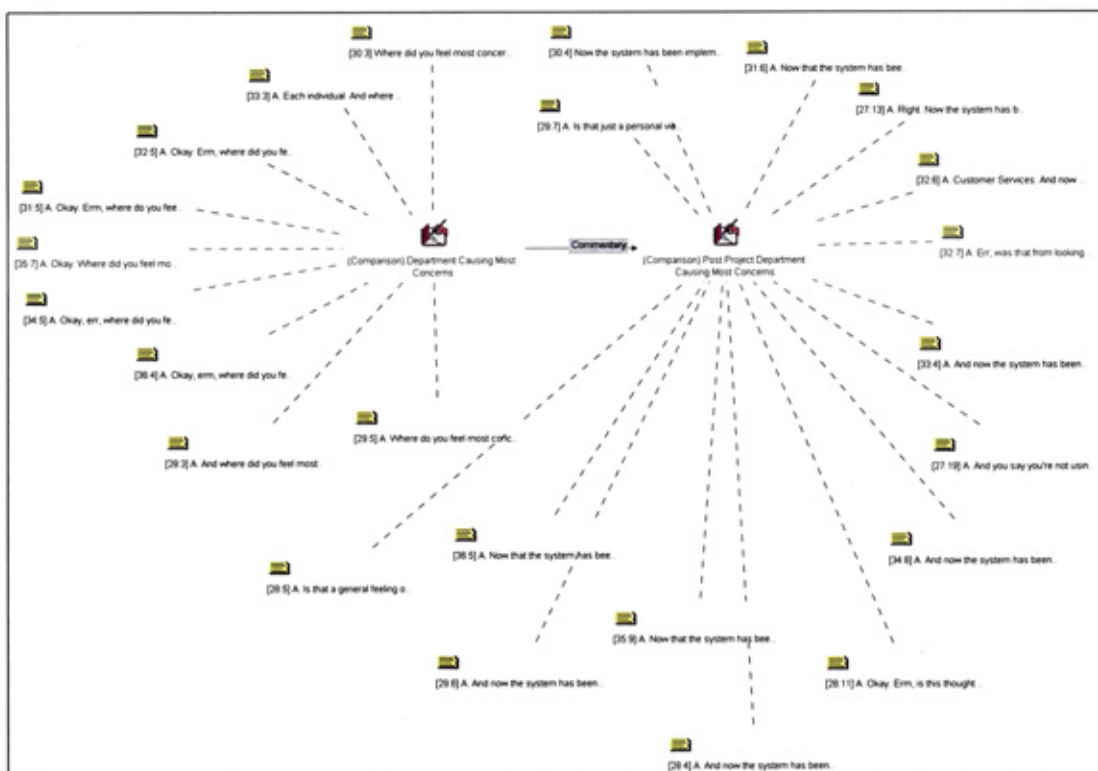


Figure E.15

*The Original Network for Appendix J, Figure J.4 A Comparison of Customers Envisioned to be Logged at the Design Stage with what Customer Classes are Actually Being Logged*

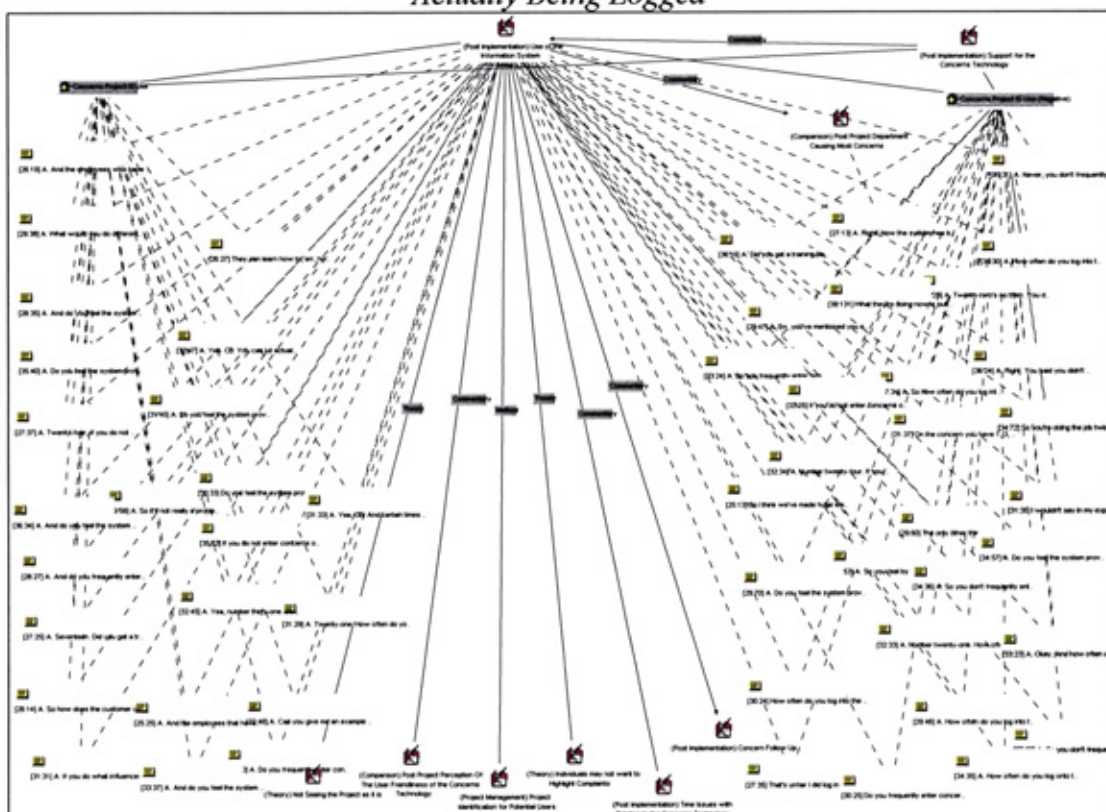


Figure E.16

*The Original Network for Appendix J, Figure J.5 Features of Using the Information System Now that it has been Implemented*



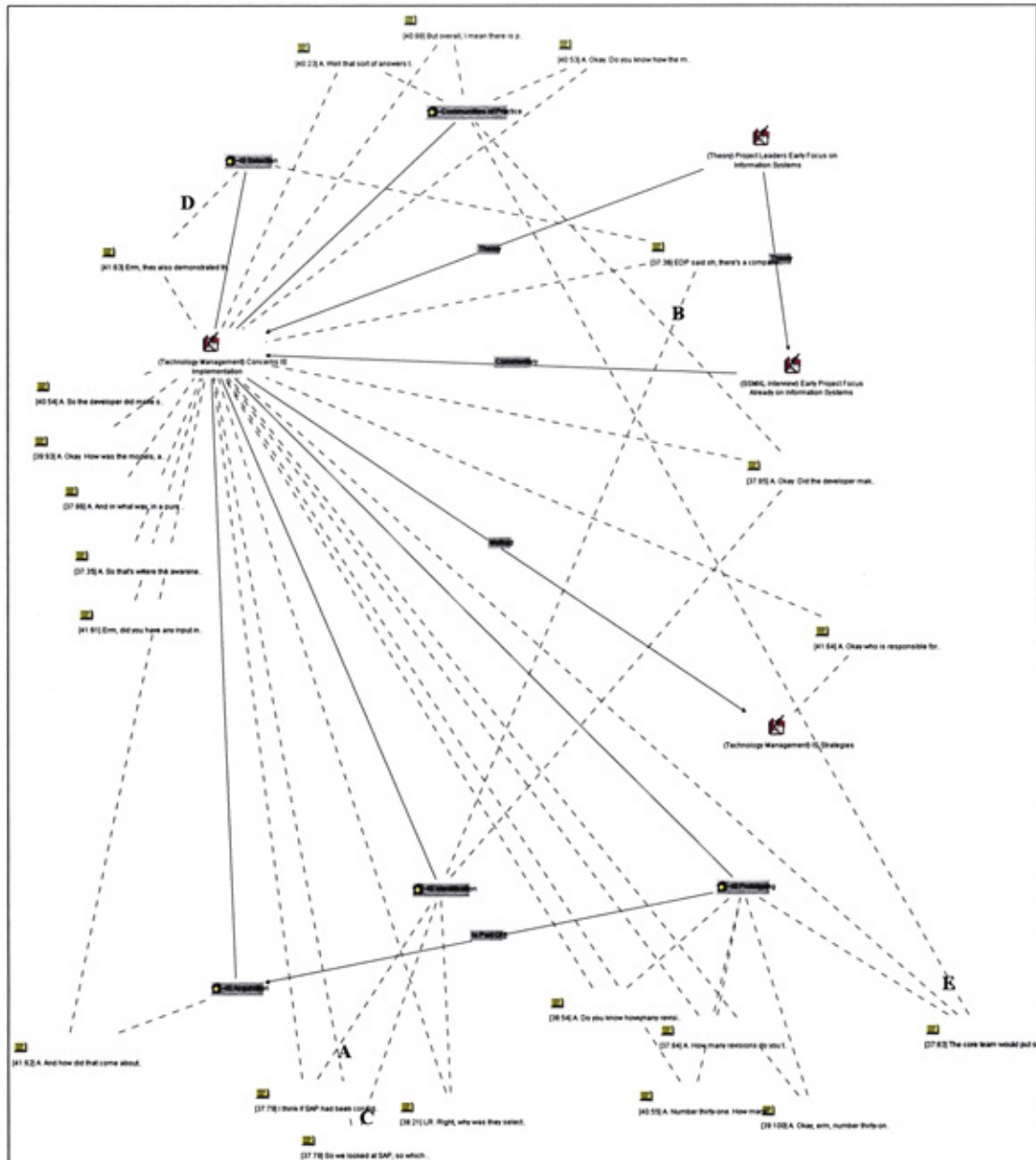


Figure E.17

*The Original Network for Appendix K, Figure K.3 Identifying, Selecting and Acquiring the Concerns Technology*

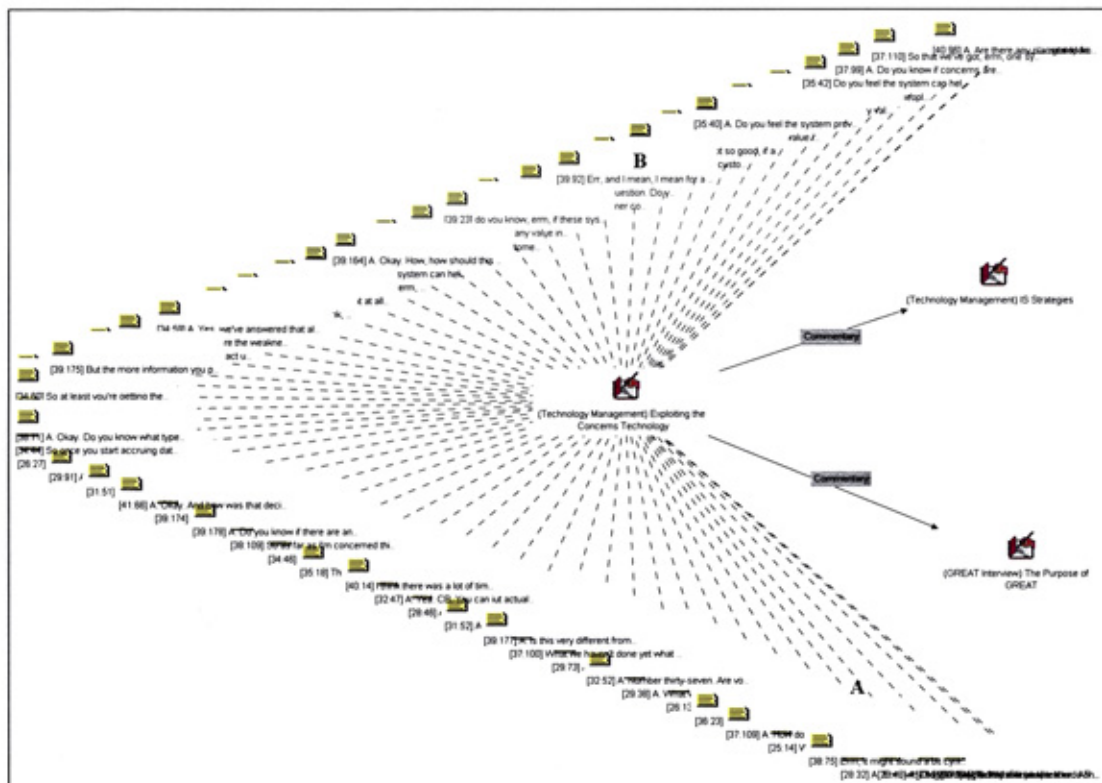


Figure E.18

*The Original Network for Appendix K, Figure K.4 Exploiting the Concerns Technology*

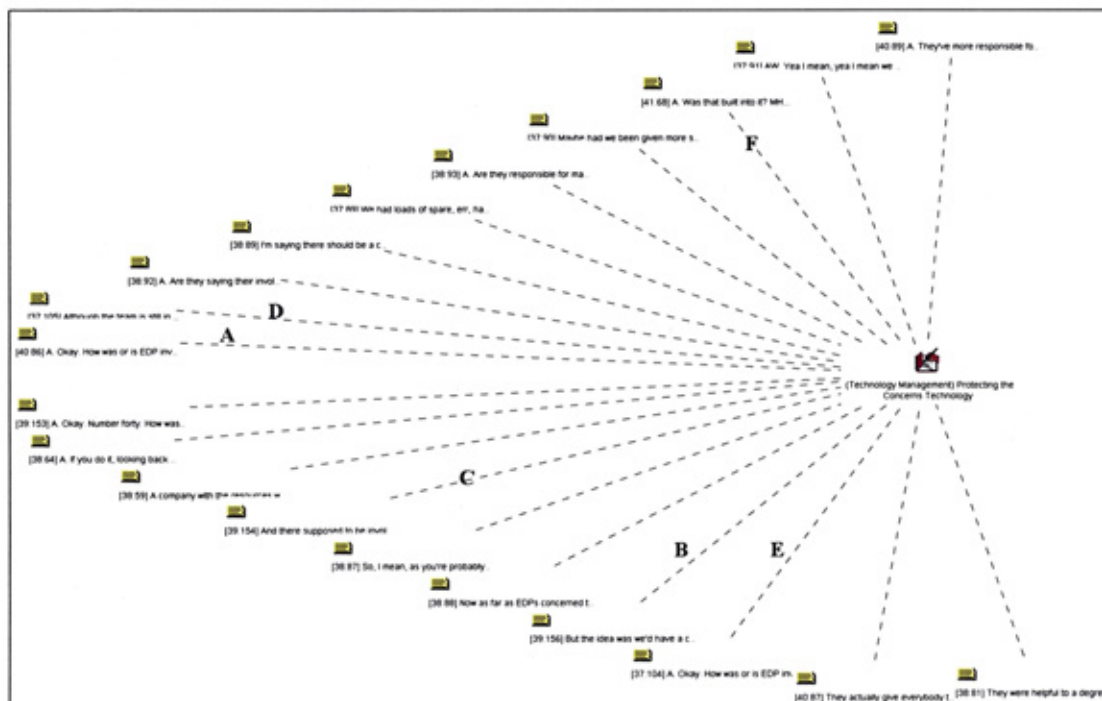


Figure E.19

*The Original Network for Appendix K, Figure K.5 Protection Issues Relating to the Concerns Technology*

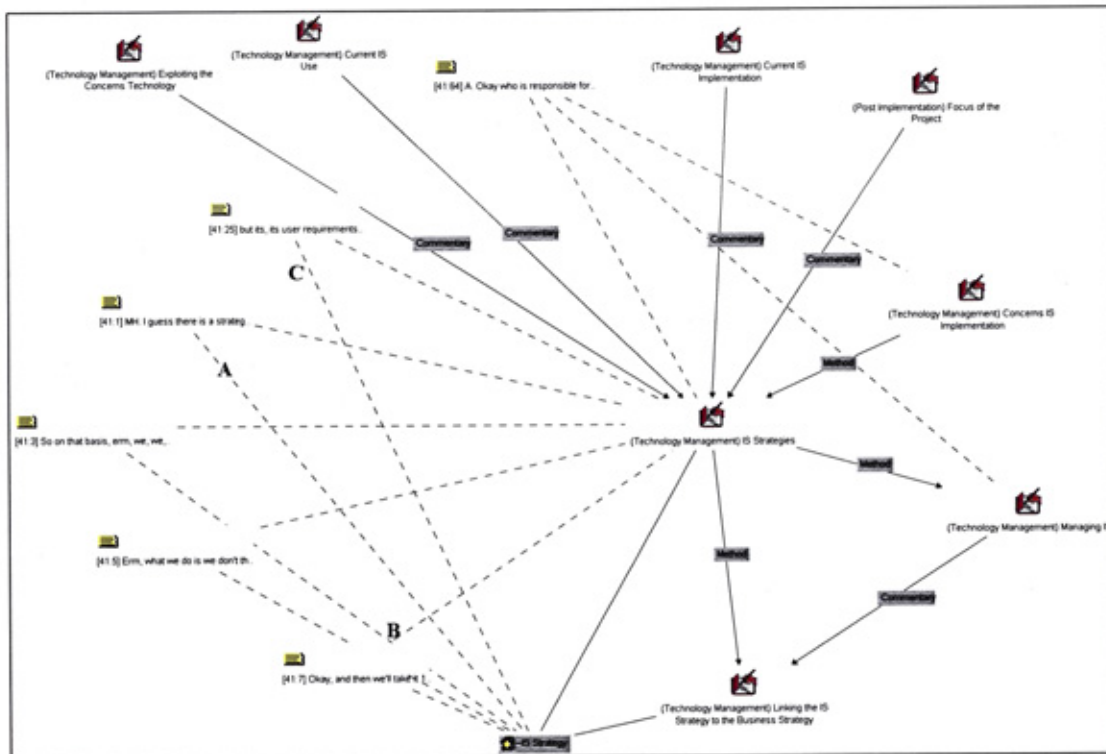


Figure E.20

*The Original Network for Appendix K, Figure K.7 The Concerns Technology and its Relation to BreathCo's Information Systems Strategy*

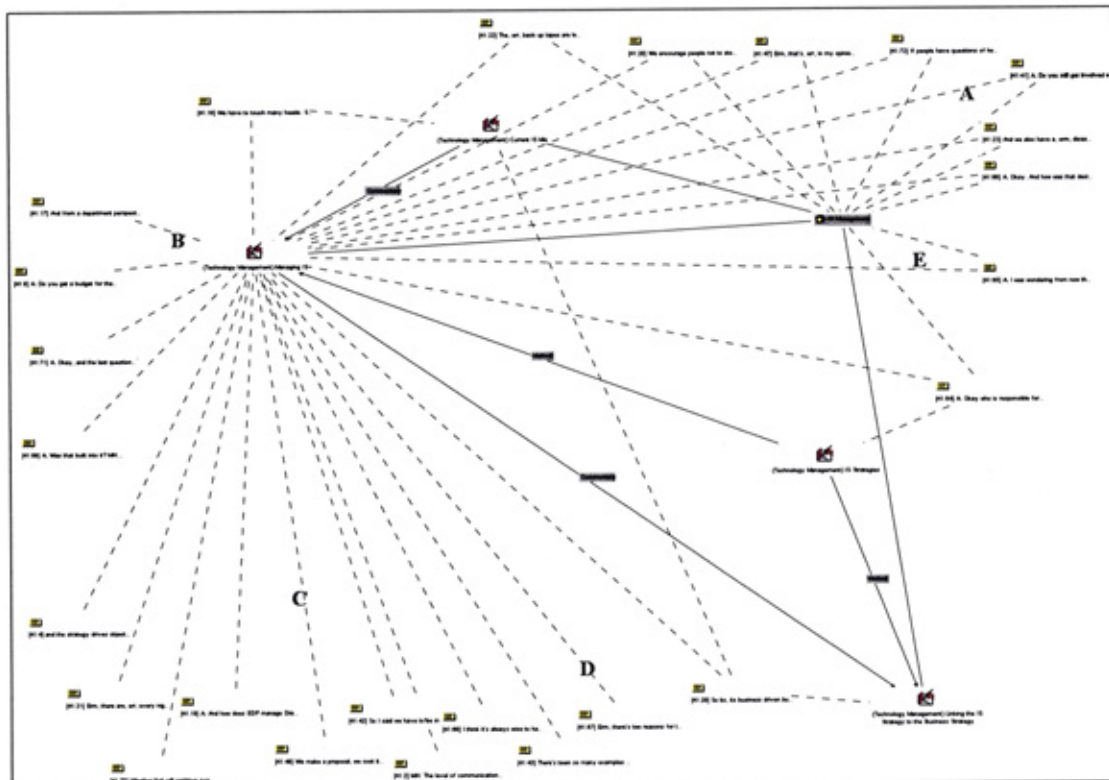


Figure E.21

*The Original Network for Appendix K, Figure K.8 BreathCo's Management of Information Systems*

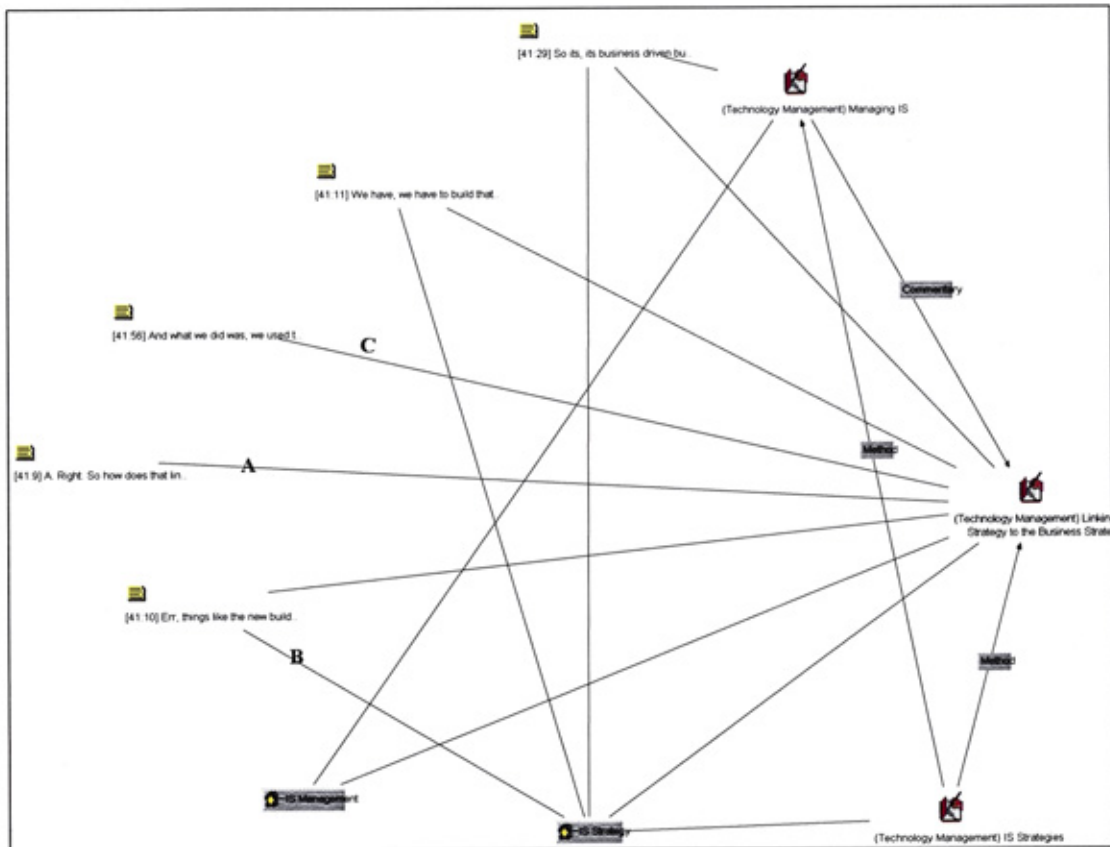


Figure E.22

*The Original Network for Appendix K, Figure K.9 Linking the Information Systems Strategy to the Business Strategy for BreathCo*

## Appendix F - The Code and Code Frequency List and The Memo List

CODES/Primary Documents	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Automating Culture	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Benefits	5	0	0	0	0	0	1	0	2	2	1	0	0	0	0	0	0	0	0	0
Benefits (Intangible)	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Benefits (Tangible)	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Communication	0	3	0	2	3	3	4	4	2	13	0	10	12	2	4	4	2	2	3	0
Communication (Negative)	0	1	4	0	1	0	0	1	1	2	5	0	5	0	0	0	0	0	0	0
Communication (Positive)	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Communities of Practice	0	0	0	0	0	0	0	1	0	2	0	2	0	0	0	0	0	0	0	0
Communities of Practice (Negative)	0	3	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
Competitor Comparison	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Concent Consistency	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Concerns Project (Negative)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Concerns Project (Positive)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Concerns Project (Post Project Focus)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Concerns Project (S Use)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	1	0	0
Concerns Project (S Use (Negative))	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Concerns Project Mental Model	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Customer Identification	3	1	2	0	4	2	3	0	4	2	2	5	4	1	0	0	0	0	0	0
Customer Identification (External)	0	1	0	0	3	3	1	0	0	2	2	2	1	0	0	0	0	0	0	0
Customer Identification (Internal)	2	1	1	0	2	1	0	0	2	1	2	2	1	0	0	0	0	0	0	0
Customer Perception	1	1	1	0	2	1	0	1	0	0	0	0	2	0	0	0	0	0	0	0
Customer Satisfaction	9	2	6	2	5	1	4	0	7	5	0	6	6	2	1	0	0	2	1	0
Customer Satisfaction (Negative)	7	1	3	0	1	0	6	2	3	3	0	1	1	0	0	1	0	1	0	0
Customer Satisfaction (Positive)	4	2	3	0	1	0	1	2	0	0	1	7	7	0	2	0	1	0	0	0
Departmental Co-operation	5	3	3	0	3	6	3	4	4	7	1	0	3	1	0	0	0	1	2	0
Departmental Co-operation (Negative)	0	2	8	0	0	0	0	0	0	1	2	0	6	0	0	0	0	0	0	0
Education Programme	2	1	1	0	1	3	0	1	6	2	0	3	4	1	0	0	0	0	0	1
Employee Commitment	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Employee Satisfaction	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Facility Processes	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3	1
Familiarity Processes (Negative)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IS Acquisition	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IS Exploitation	0	0	0	0	0	1	0	0	2	0	0	0	0	0	1	1	1	0	0	0
IS Exploitation (Negative)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IS Focus	1	0	1	0	4	1	0	0	5	0	0	0	3	0	0	0	0	1	0	0
IS Identification	3	0	0	0	1	1	0	0	3	0	0	0	2	0	0	0	0	0	0	0
IS Making Tacit Explicit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IS Management	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0
IS Protection	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IS Protection (Negative)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IS Prototyping	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IS Selection	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
IS Strategy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
IS Use	0	1	1	0	6	1	0	0	4	0	0	0	0	0	0	1	0	1	0	0
IS Use (Negative)	0	0	7	0	1	1	0	0	1	0	0	2	1	1	0	0	0	0	3	0
IS Use (Positive)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Identifying a Problem Area	5	2	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0
Individual Awareness	9	5	17	0	6	1	3	2	2	1	0	1	1	0	0	0	0	0	0	0
Individual Awareness (Negative)	0	5	0	3	3	0	4	2	1	6	4	6	13	3	2	3	3	3	1	2
Individual Effectiveness	6	5	8	2	2	1	3	2	6	8	0	1	0	0	0	0	0	0	0	0
Individual Effectiveness (Negative)	1	1	0	0	1	0	0	0	0	0	0	0	4	1	0	0	0	0	0	0
Individual Perception	21	2	7	3	13	7	9	4	7	3	5	8	8	3	0	3	1	2	1	1
Individual Perception (Negative)	5	2	13	0	10	3	5	4	8	4	3	4	10	2	3	0	0	3	3	2
Individual Perception (Positive)	3	1	0	2	3	5	1	2	3	3	0	3	1	0	1	1	2	0	0	0
Internal Competence and Expertise (Available)	3	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Internal Competence and Expertise (Not Available)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IT Departmental Support	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IT Departmental Support (Negative)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Job Role	3	4	11	4	4	5	5	2	7	7	1	3	1	0	0	0	1	0	0	2
Language Development	0	1	0	0	2	0	1	2	4	0	0	0	1	3	1	1	1	3	0	1
Learning from Experience	0	0	0	0	0	2	1	0	0	3	0	0	1	0	0	0	0	1	0	0
Learning from Experience (Negative)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mental Model (General)	8	3	9	6	9	1	4	2	4	2	4	1	3	0	0	0	0	0	0	0
Non-Technology Communication	0	0	0	0	1	0	0	0	1	4	0	4	6	0	0	0	0	0	0	0
Organisational Awareness	9	1	8	0	2	0	2	2	5	1	0	3	4	0	0	4	0	0	0	0
Organisational Awareness (Negative)	0	1	1	0	0	2	0	2	0	0	1	0	1	0	0	1	0	0	0	0

## The Code and Code Frequency List and The Memo List

[illegible]

## Appendix F

## The Code and Code Frequency List and The Memo List

CODES/Primary Documents	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	Totals
Automating Culture	0	0	0	0	1	3	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0	8
Benefits	0	0	0	0	6	1	2	0	0	1	0	1	0	0	0	0	1	3	0	0	6	35
Benefits (Intangible)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	7
Benefits (Tangible)	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
Communication	0	0	0	0	1	1	1	5	1	2	3	2	1	2	0	2	8	11	17	13	9	162
Communication (Negative)	0	0	0	0	0	1	3	0	1	0	2	7	1	4	1	0	0	1	3	0	3	48
Communication (Positive)	0	0	0	0	0	0	0	2	0	0	0	0	2	0	1	1	0	1	1	0	1	16
Communities of Practice	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	9	5	14	7	4	43
Communities of Practice (Negative)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	9
Communities of Practice (Positive)	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	9
Competitor Comparison	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	7	4	4	3	0	46
Concern Consistency	0	0	0	0	3	0	1	0	9	0	11	4	2	26	4	4	1	0	3	1	0	95
Concerns Project (Negative)	0	1	0	0	0	0	16	10	13	6	1	4	2	26	4	4	1	0	3	1	0	95
Concerns Project (Positive)	0	0	0	0	0	8	9	8	15	3	11	9	11	6	7	5	8	8	5	7	0	130
Concerns Project (Post Project Focus)	0	0	0	0	3	7	1	0	5	0	2	1	0	4	1	3	15	12	16	12	0	81
Concerns Project IS Use	0	0	0	0	2	4	6	5	14	1	24	11	6	2	2	4	11	3	5	5	0	110
Concerns Project IS Use (Negative)	0	0	0	0	1	0	11	7	10	5	8	12	9	28	14	14	3	2	7	2	0	134
Concerns Project Mental Model	0	0	0	0	6	5	7	2	10	1	11	12	6	14	5	4	4	1	6	1	0	99
Customer Identification	0	0	0	0	1	1	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	38
Customer Identification (External)	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18
Customer Identification (Internal)	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18
Customer Perception	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Customer Satisfaction	0	1	0	0	2	1	3	1	4	0	2	2	0	4	0	1	0	2	6	3	0	13
Customer Satisfaction (Negative)	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	1	0	0	91
Customer Satisfaction (Positive)	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	36
Departmental Co-operation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19
Departmental Co-operation (Negative)	0	0	0	0	0	0	1	0	3	1	0	3	1	0	2	3	5	7	8	4	4	110
Education Programme	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	11	4	1
Employee Commitment	0	0	0	0	0	1	0	0	0	0	0	1	0	3	0	0	0	2	0	0	0	34
Employee Satisfaction	0	0	0	0	1	0	0	2	2	0	0	2	0	0	0	0	5	8	9	1	0	32
Family Processes	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1	0	0	0	3
Family Processes (Negative)	0	0	0	0	2	0	1	2	0	0	0	1	0	0	0	0	3	10	0	10	2	43
IS Acquisition	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	3
IS Exploitation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	6
IS Exploitation (Negative)	0	0	0	0	3	3	5	4	6	0	11	4	7	9	3	7	10	12	6	3	104	
IS Focus	1	0	3	2	0	0	1	3	0	5	3	5	7	7	7	9	4	4	3	0	2	84
IS Identification	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	16	12	12	8	119
IS Identification (Negative)	0	0	0	0	0	0	0	1	0	0	4	0	1	0	0	0	2	14	6	2	0	13
IS Making Fact Explicit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
IS Management	0	0	0	0	0	0	1	0	0	0	0	1	0	0	2	0	6	7	3	4	13	42
IS Protection	0	0	1	0	1	0	0	1	0	1	0	0	0	0	0	0	1	6	3	3	17	36
IS Protection (Negative)	0	1	0	0	1	0	0	1	0	0	1	0	2	0	0	0	0	2	0	0	1	3
IS Prototyping	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	4	1	2	1	0
IS Selection	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	2	3	1	0	7	17
IS Strategy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	18
IS Use	0	0	3	0	1	0	6	1	6	1	2	2	3	7	0	3	13	11	5	10	1	94
IS Use (Negative)	0	0	0	0	0	1	0	1	5	2	2	2	3	7	0	0	3	13	5	10	1	94
IS Use (Positive)	0	0	0	0	0	0	1	1	5	2	2	2	2	1	6	5	2	3	7	5	0	60
Identifying a Problem Area	0	0	0	0	0	0	0	0	1	0	2	0	1	0	2	1	0	0	0	0	0	7
Individual Awareness	0	0	0	0	3	8	1	1	0	0	2	0	0	7	0	0	1	4	4	2	0	55
Individual Awareness (Negative)	0	2	1	0	12	7	3	12	13	5	10	8	7	16	8	6	27	14	17	5	2	297
Individual Effectiveness	0	0	0	0	3	1	11	2	10	3	7	8	4	13	7	2	8	4	4	4	1	120
Individual Effectiveness (Negative)	0	0	0	0	2	1	2	1	5	0	7	1	4	5	1	1	2	2	5	3	1	91
Individual Perception	0	0	0	0	0	1	7	4	4	2	2	6	5	10	13	9	1	1	4	1	0	79
Individual Perception (Negative)	0	0	1	0	1	4	10	7	7	5	7	9	12	15	13	13	28	18	16	15	0	269
Individual Perception (Positive)	0	0	0	0	9	2	5	5	26	9	5	12	1	8	3	2	8	17	15	5	0	225
Internal Competence and Expertise (Available)	0	0	0	0	5	3	11	11	6	6	15	8	9	10	4	6	5	14	4	4	2	168
Internal Competence and Expertise (Not Available)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	5	18
IT Departmental Support	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	4
IT Departmental Support (Negative)	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	5	3	7	4	10	34
Job Role	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	6	0	0	0	10
Language Development	0	0	0	0	4	6	5	5	18	0	9	9	3	9	4	6	4	18	20	0	7	167
Learning from Experience	1	0	2	0	1	0	0	0	3	3	0	4	0	2	0	0	1	8	0	0	0	76
Learning from Experience (Negative)	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	4	4	1	3	0	13
Mental Model (General)	0	0	0	0	0	0	0	0	0	0	6	2	3	4	5	3	10	14	15	5	1	133
Non-Technology Communication	0	0	0	0	2	1	2	1	3	0	6	2	0	0	0	0	0	1	4	2	1	24
Organisational Awareness	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	1	1	1	4	2	1	44
Organisational Awareness (Negative)	0	0	2	0	2	5	2	2	2	0	3	3	1	2	2	2	12	17	18	8	6	129
Organisational Consistency	0	0	0	0	0	1	1	1	5	0	2	3	0	5	2	2	2	3	3	3	1	44



## The Code and Code Frequency List and The Memo List

[illegible]



## Appendix F The Code and Code Frequency List and The Memo List

Memo
(Comparison) At Start Quality Responsible and in Charge of Concerns {10/Co} - Super
(Comparison) Customer Identification at Project Use {12/Co} - Super
(Comparison) Department Causing Most Concerns {9/Co} - Super
(Comparison) First Perception Of The User Friendliness of the Concerns Technology {15/Co} - Super
(Comparison) Logging of Concerns at Design Stage {5/Co} - Super
(Comparison) Post Project Department Causing Most Concerns {15/Co} - Super
(Comparison) Post Project Perception Of The User Friendliness of the Concerns Technology {8/Co} - Super
(Comparison) Quality Perceived to be Responsible for Concerns {30/Co} - Super
(General) BreathCo Operations too Slow {26/Me} - Super
(General) Individuals Fire Fighting {7/Me} - Super
(General) Language Development {42/Co} - Super
(General) Modelling Tools {23/Me} - Super
(General) Perception of Receiving Complaints/Concerns {27/Co} - Super
(General) Reflections {8/Co} - Super
(General) Senior Management Support {31/Co} - Super
(General) Standard Operating Problems the Organisation Faces {37/Co} - Super
(General) The Benefits of the Project {21/Me} - Super
(General) Training Issues {8/Me} - Super
(GREAT Interview) GREAT Acronym {2/Co} - Super
(GREAT Interview) GREAT Confusion {15/Co} - Super
(GREAT Interview) The Purpose of GREAT {42/Me} - Super
(Learning) Learning from Experience {22/Me} - Super
(Learning) Learning Theories {39/Co} - Super
(Learning) Other Processes {6/Me} - Super
(Post Implementation) Concern Follow Up {12/Co} - Super
(Post Implementation) Concerns Technology as a Communication Channel {24/Co} - Super
(Post Implementation) Focus of the Project {34/Co} - Super
(Post Implementation) Potential Future Usefulness of the Technology {37/Co} - Super
(Post Implementation) Responsible for Concerns {36/Me} - Super
(Post Implementation) Support for the Concerns Technology {12/Co} - Super
(Post Implementation) Time Issues with Relation to the Concerns Technology {22/Co} - Super
(Post Implementation) Types of Concerns being Logged at Project Use {20/Co} - Super
(Post Implementation) Use of the Information System {54/Co} - Super
(Post Project) Change In Title {10/Co} - Super
(Project Development) Team Identification {16/Me} - Super
(Project Management) Project as Another Task {14/Me} - Super
(Project Management) Project Identification {17/Me} - Super
(Project Management) Project Identification for Potential Users {15/Me} - Super
(Project Management) Project Justification {24/Me} - Super
(Project Management) Project Length Confusion {7/Co} - Super
(Project Management) Project Management {29/Me} - Super
(Project Management) Project Team Assignment {24/Me} - Super
(SSMXL Interview) Customer Satisfaction {14/Me} - Super
(SSMXL Interview) Early Project Focus {17/Co} - Super
(SSMXL Interview) Early Project Focus Already on Information Systems {9/Co} - Super
(SSMXL Interview) Identifying Particular Classes of Customers {18/Co} - Super
(SSMXL Interview) Proposed Actors of Solution {14/Me} - Super
(SSMXL Interview) Proposed Constraints {8/Me} - Super
(SSMXL Interview) Proposed Owners of Solution {14/Me} - Super
(SSMXL Interview) Solution to the Problem of Customer Concerns {22/Co} - Super
(Technology Management) Concerns IS Implementation {21/Me} - Super
(Technology Management) Current IS Implementation {22/Co} - Super
(Technology Management) Current IS Mix {10/Co} - Super
(Technology Management) Current IS Use {9/Co} - Super
(Technology Management) Exploiting the Concerns Technology {61/Co} - Super
(Technology Management) IS not Being used to Enhance the Organisation {27/Co} - Super
(Technology Management) IS Strategies {6/Me} - Super
(Technology Management) Linking the IS Strategy to the Business Strategy {5/Me} - Super
(Technology Management) Managing IS {25/Co} - Super
(Technology Management) Not Exploiting the Concerns Technology {53/Co} - Super
(Technology Management) Protecting the Concerns Technology {20/Me} - Super
(Technology Management) Senior Management Involvement {4/Co} - Super
(Theory) A Larger Team May Cause the Project to Move at a Slower Pace {12/Th} - Super
(Theory) Communication may Hinder as well as Help an Organisation {24/Th} - Super
(Theory) Currently Perceived Responsibility for Concerns {14/Th} - Super
(Theory) Early Look to Training Issues {1/Co} - Super
(Theory) Individuals may not want to Highlight Complaints {14/Th} - Super
(Theory) Individuals Role within the Organisation {27/Th} - Super
(Theory) Not Seeing the Project as it is {11/Th} - Super
(Theory) Perceived Individuals who will Use the Technology {14/Th} - Super
(Theory) Power and Politics {2/Th} - Super
(Theory) Project Development Team {5/Th} - Super
(Theory) Project Leaders Early Focus on Information Systems {0/Th} - Super
(Theory) Researcher Involvement {20/Me} - Super
(Theory) Systems Thinking about the Organisations Business {7/Th} - Super
(Training) Improvements Trainees Would Have Liked To Have Seen {24/Co} - Super
(Training) Individuals Negative Feelings About the Training Plan and Impressions for the Concerns Technology {59/Co} - Super
(Training) Individuals Positive Feelings About the Training Plan and Impressions for the Concerns Technology {37/Co} - Super
(Training) Issues with Training Plan for the Concerns Technology from the Design Team {7/Me} - Super
(Training) Learning the Best Method of Training Staff from other Courses {2/Me} - Super
(Training) Negative Training Issues from Design Team {16/Co} - Super
(Training) Present at Training {4/Co} - Super
(Training) Summary of Training Given {13/Co} - Super
(Training) Training Emphasis on the Benefits of the Project {1/Me} - Super
(Training) Training Reflection for the Design Team {17/Co} - Super
Customer Concern Technology {0/Co} - Super

**Table F.2**  
**Memo List**

Appendix G – An Example of a BreathCo Action List

Title of meeting		Date			
Participants		Created by			

No.	Action	Target / Expected Result	Responsible	By	Status
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

Implementation Status

25 %

50 %

75 %

100 %

No progress

## Appendix H – Data Collection Methods Used Throughout the Primary Research

### **H.0 Interview Questions Relating to Investigating Customer Complaints within BreathCo**

Interviewee:

Job Description:

#### **Section One General Questions**

1. When did you first become aware that there existed a need to improve a way to handle complaints?
2. And where did this awareness come from?
3. How did you come to be involved in the team to look at the way complaints are handled?
4. From the discussions, and meetings that have taken place so far, how do you feel the development of the project is progressing?
5. From the discussions and meetings that have taken place what would you like to see done differently?
6. What direction do you feel the project is taking?
7. What constraints do you know of that the project has to abide by?
8. Do you feel that senior management will empower the members of the team to implement any outcome they feel will tackle the problems of customer complaints?

#### **Section Two The Management of Complaints**

9. If the purpose is to find a process for handling complaints could you list who would constitute as coming under the umbrella of a 'customer'?
10. And how would they rank, in order of priority, if you decided one group holds more priority over others?
11. How do **you** currently handle complaints? (If this question is not applicable do you know who in your department currently handles complaints? And how they manage this process)
12. Who currently has managerial responsibility (primarily in charge) for handling complaints for all departments as a company wide initiative?

13. What advantage(s) does the current process for handling complaints possess, either departmentally or company wide?
14. What disadvantage(s) does the current process for handling complaints possess, either departmentally or company wide?

**Section Three Your Perfect View**

15. In your view, in a 'perfect world', how would complaints be handled?
16. And in this 'perfect world' who would have responsibility (be primarily in charge) for handling complaints?
17. And in the 'perfect world' what forces or individuals could cause the handling of complaints to change from the way that you have just described?

**H.1 Questionnaire Designed to Capture Trainees Early Impressions of the  
Concerns Technology****YOUR PARTICIPATION IS IMPORTANT**

<p>When completing this questionnaire, please:</p> <ul style="list-style-type: none"> <li>• Answer questions in all sections and please select only one option for each question</li> <li>• Please tick or write (when required) your answers clearly with a pen</li> <li>• If you make a mistake, just cross it out and pick another option</li> </ul>
---

**Section One: General Customer Concerns Issues**

Statement	Strongly Disagree	Disagree	Agree	Strongly Agree
I receive concerns on a regular basis.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Concerns take a lot of my time daily.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
I receive the same concerns regularly.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
I feel the company deals with concerns in an ad hoc manner.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
If problems relating to concerns were made visible, corrective actions could be put into place.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Concerns are good for the company.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3

**Section Two: Perceived Attitudes to the Customer Concerns Technology**

Statement	Strongly Disagree	Disagree	Agree	Strongly Agree
The customer concern technology will allow me to control the content of my job with relation to dealing with concerns.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
The customer concern technology will allow me to initiate projects of my own through the data	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3

## Appendix H

### Data Collection Methods Used throughout the Primary Research

that will be collected.				
Statement	Strongly Disagree	Disagree	Agree	Strongly Agree
The customer concern technology will allow the communication of knowledge to reach all levels of the organisation.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
The customer concern technology will allow me to participate in joint learning events with our suppliers, customers and other stakeholders through the data that will be collected.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3

### Section Three: Perceived Benefits the Customer Concerns Technology Will Bring

Statement	Strongly Disagree	Disagree	Agree	Strongly Agree
I could use the customer concern technology to help me to improve my own function.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
I can use the customer concern technology to identify training needs.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
The customer concern technology will allow me a place to learn and create knowledge.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
How long do you think it will take before you see any value from the customer concern technology?				

Please feel free to add any comments you feel will help

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**H.2 Follow up Interview Questions with Participants of BreathCo about the  
Concerns Technology**

**Section One General Questions**

1. Why was quality perceived to be responsible for concerns?
2. Who is responsible for concerns now the technology has been implemented?
3. Where did you feel most concerns came from?
4. Now the technology has been implemented where do you feel most concerns come from?

**Section Two Training Issues**

5. Could you sum up the training course for the concern technology?
6. What good points came from the training?
7. What not so good (if any) points came from the training?
8. Did the technology look user friendly?
9. Is this thought still held?
10. Was the training presentation informative and could you give me some details upon how you found it?
11. What would you have liked to see improved with the presentation that you were given?
12. Was the practice examples given after the training presentation useful?
13. Were there problems with the laptops at your training session?
14. If yes, did this affect your perception of the technology?
15. Did you feel the venue the training took place in was suitable?
16. What would you have liked to see done differently?
17. Did you use the training tile to practice on after the training?
18. If you have, or experience difficulty in the future, or are unsure upon an aspect(s) of the technology, where or who would you seek for assistance?
19. Did you review the training manual that is held on the shared network drive?

**Section Three The Customer Concerns Technology**

20. When were you first aware that the customer concerns project was being undertaken, and what were your feelings?

21. How often do you log into the concern technology?
22. Do you frequently enter concerns onto the technology?
23. If you do what influences you to do this?
24. If you do not enter concerns, or enter only a small number of concerns, what factors would you attribute to influencing this?
25. Has communication channels throughout the organisation been altered, with reference to concerns, through the outcome of the project?
26. Can you give me an example?
27. How long do you feel the technology can remain useful?
28. Why do you feel this?
29. Do you know if concerns are followed up to see if they have been satisfied?
30. What types of complaints are being logged onto the technology i.e. big complaints or just small ones?
31. Do you feel the technology provides a way of linking information with other departments?
32. Can you give me an example of this?
33. What particular customer classes are logged into the technology?
34. Do you feel the technology is time consuming?
35. Can you give me an example?
36. Do you feel the technology can help you develop at your job in the long run?
37. Are you seeing any value from the technology?
  - (a) Now?
  - (b) Perceive any in the future?

**Section Four Concerns Management Reporting Functions**

38. How have you found the reporting functions within the technology?
39. Do you run reports to Excel?
40. Have you used the word template that is located within the technology to write to a customer with relation to their concern?



## **Appendix H**

### **Data Collection Methods Used throughout the Primary Research**

41. From any output created from the technology, have you used it within your job (i.e. to highlight problem areas, to look for specific problems you feel exist etc.)?
42. Do you, or know of other individuals, within your department that have started an improvement project through the use of the concern technology?

**H.3 Follow up Interviews with the Main Project Leaders of the Concerns Project  
at BreathCo****Section One General Questions**

1. When were you aware that the customer concerns project was being undertaken, and what were your feelings?
2. Why do you think the project was renamed as the customer concern technology instead of customer complaints?
3. Do you feel this change affected the outcome of the technology that was designed?
4. Why was quality perceived to be responsible for concerns?
5. Could you explain what technologies existed that handled hard complaints?
6. Were these technologies available to anyone within the organisation?
7. Are these technologies still running or being undertaken on the technology?

**Section Two The Design of the Customer Concerns Technology**

8. How was the overall team that was involved in this project selected?
9. Are all projects undertaken in the same way, i.e. follow a set process?
10. Do you feel the process this project followed is better or worse than other projects you have been involved with?
11. What technology vendor was selected and why?
12. Was the forming of the team the correct way to design the technology?
13. Could it have been undertaken in another way?
14. How did the team develop the models that were used to design the technology (see models)?
15. How did you define the different categories of complaints and were they the actual ones that are now used within the technology (see models)?
16. How long did this whole process take?
17. What were the main disagreements or themes that had to be resolved in creating the models?
18. How were these resolved?
19. How was the language that is relevant to the technology developed (i.e. 'Responsibility' and 'Ownership')?

- 20. Do you think senior management should have been involved more with the project?
- 21. What do you think senior management would have done differently?
- 22. Do you feel I provided any valuable research into the concerns project?
- 23. How did I (or did not) undertake this task?
- 24. Was the document that I produced helpful and was it used to define the models that were created?
- 25. If so how, or if not, what tools or techniques were?

**Section Three Developing The Customer Concern Technology**

- 26. Why was the quality department handed the primary responsibility of developing the technology?
- 27. Who was on this team, and why were they selected?
- 28. How was the project justified in the end and where did the money come from?
- 29. How were the models that the design team created presented to the developer?
- 30. Did the developer make any suggestions upon the design of the technology?
- 31. How many revisions did the technology go through before a satisfactory technology was developed?
- 32. How was the training programme constructed?
- 33. Could you discuss your views upon the technology problems with relation to the laptops relating to the training programme?
- 34. In your view how did you feel the training programme went?
- 35. What would have you done differently?

**Section Four Current Issues With Relation to the Concern Technology**

- 36. Who do you feel should be responsible for monitoring the technology, and why do you think this?
- 37. Are concerns followed up to see if they have been satisfied?
- 38. What types of complaints are being logged onto the technology i.e. big complaints or just small ones?
- 39. If the concern technology is available within most departments, can you tell me of any other communication technologies (does not have to be technological) that can reach all parts of the organisation?

40. How was/is EDP involved with the concern technology?

**Section Five Future Plans for the Concerns Technology**

41. When do you think a review of the current usefulness of the technology should be undertaken?

42. How should this review be undertaken?

43. Who should undertake this review and why?

44. How do you envision the technology will be used in the future?

45. Is this very different from how it is used now?

46. Are there any plans to update the technology based on comments from individuals who use it?

**Section Six Other Issues**

47. What is a storyboard, why are they used and do they, or will they, have any connection with this project?

48. How are all surveys and questionnaires related to GREAT?

49. Does your department hold formal documents that would be viewed as helping individuals to improve their function?

50. If so where are they to be found?

51. What are GREAT tools (i.e. PSP) and what is there purpose?

52. Are the action lists that are constructed to chart the progress of meetings part of GREAT or PSP?

**H.4 Interview Questions for the EDP Manager of BreathCo Relating to the  
Concerns Technology and Technology Management**

**Section One General Questions**

1. What is EDP's ICT strategy?
2. How does it link to the business strategy?
3. What are the main tasks in your job that continually occupies your time?
4. How does EDP manage BreathCo's data?
5. How would you describe the IT culture of BreathCo? I.e. an innovator in IT, a follower, or a dinosaur.

**Section Two Technology Management**

6. How are IT projects normally developed and deployed within BreathCo?
7. Do you seek employee's opinions upon the proposed plans for introducing new technology?
8. Do senior management have any involvement with the selection of technology?
9. Do you use any particular methodologies to develop ICTs?
10. Are qualitative measures a key factor in the selection and use of IT?

**Section Three The Development of the Customer Concerns Management  
Technology**

11. Did you have any input into the selection of the IT vendor that developed the customer concern management technology?
12. Who is responsible for maintaining the concerns technology?
13. And how was this decision taken?
14. What support do you provide to individuals who use the technology?

**H.5 Interview Questions For Participants of HealthCo Relating to Technology  
Management and the Smart Card Project**

Name:

Job Title:

**Technology Development**

1. Could you state one key technology developed within the last couple of years?
2. What benefits did this technology bring?
3. Could you compare this with a technology that was implemented more than ten years ago? If so which was more successful? Which was developed better? Why?
4. How are technologies rolled out within the NHS?
5. What are the main drivers of technologies within the NHS?
6. Are any technologies developed specifically to support other technologies within the organisation?
7. Who are involved with relation to making decisions about technology development?
8. What legislation does your organisation have to consider when looking at developing technologies?

**Technology Management**

9. What is it in technology development that you consider important in gaining new business opportunities?
10. What processes do you follow for identifying, selecting, acquiring, exploiting, and protecting new technologies?
11. How much freedom and authority does your organisation permit in allowing you (or your department) in identifying and selecting technologies yourself?
12. How are new technologies within the NHS perceived?
13. How do you justify the development of a new technology?
14. How do you measure the expected benefits from a technology?
15. How are technologies within your organisation aligned with an overall business plan?
16. Are both business and technology plans communicated throughout the organisation?

17. When a new technology is developed within the organisation how much resistance is encountered?
18. Where do you seek help with the introduction of technology into the organisation to get the benefits envisioned?
19. Who provides support after the development with technologies within the organisation?
20. Where do you find out about technology projects within your organisation?
21. Is there a knowledge base of some description that holds documents and other files about how to undertake specific technology projects within the organisation?
22. What documents do you use in undertaking technology projects within your organisation?
23. If you do not use any documents do you use any project management guidelines?
24. How does technology management support the process of learning to perform well?

**The Smart Card Project**

25. If I did not investigate the current starter/leaver process who and how would the investigation be undertaken?
26. Did the flow models provide a good form of communicating the findings?
27. Would you be able to undertake a similar process as the one I did in future investigations?
28. Did the outcome of the investigation change your thinking about the overall project?
29. Are the envisioned users of the technology allowed to participate in the project?
30. What benefits do you think this technology will bring to the organisation?
31. Is a pilot project required for all technology projects or was it just for the smart card project?
32. How were the findings of the pilot project communicated?
33. Will the findings of the pilot project effect the overall project?
34. Is there a training plan for this technology?
35. How do you know when the benefits of the technology have been reached?

## Appendix I – The Models Developed by the Complaints/Concerns Participants at BreathCo

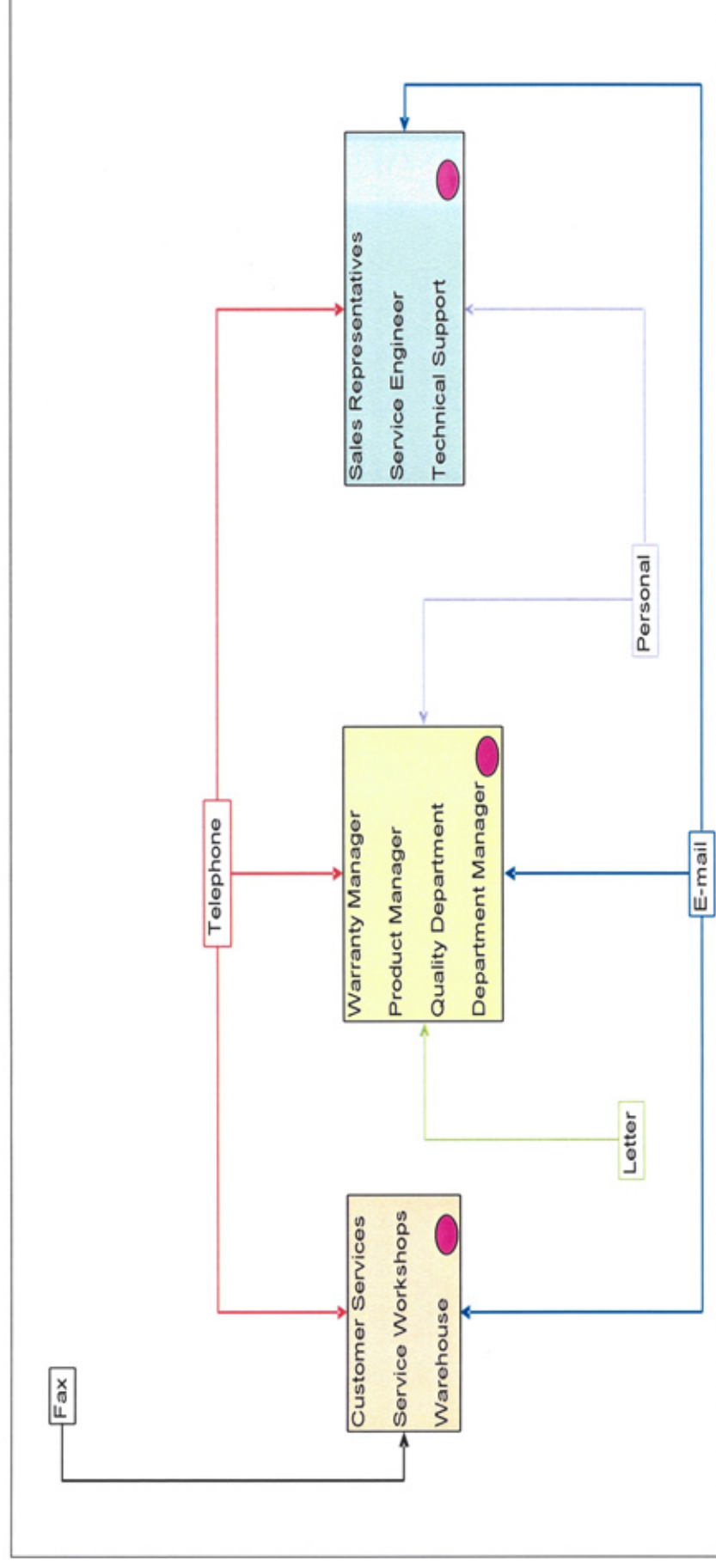


Figure I.1  
*Customer Contact Methods and Routes*



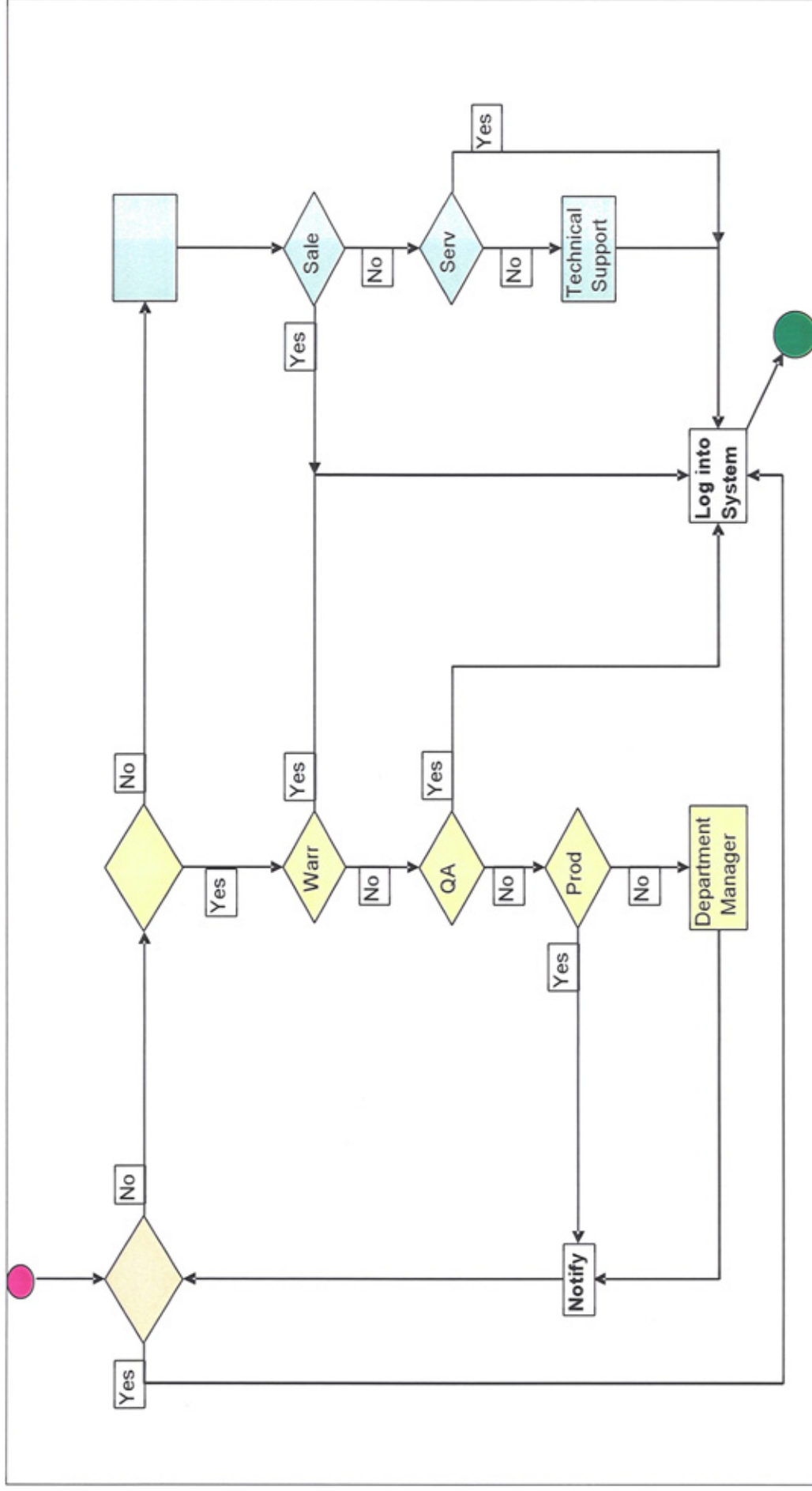


Figure I.2

*A Perspective View on Where a Technology Could be Placed within the Complaints/Concerns 'System'*

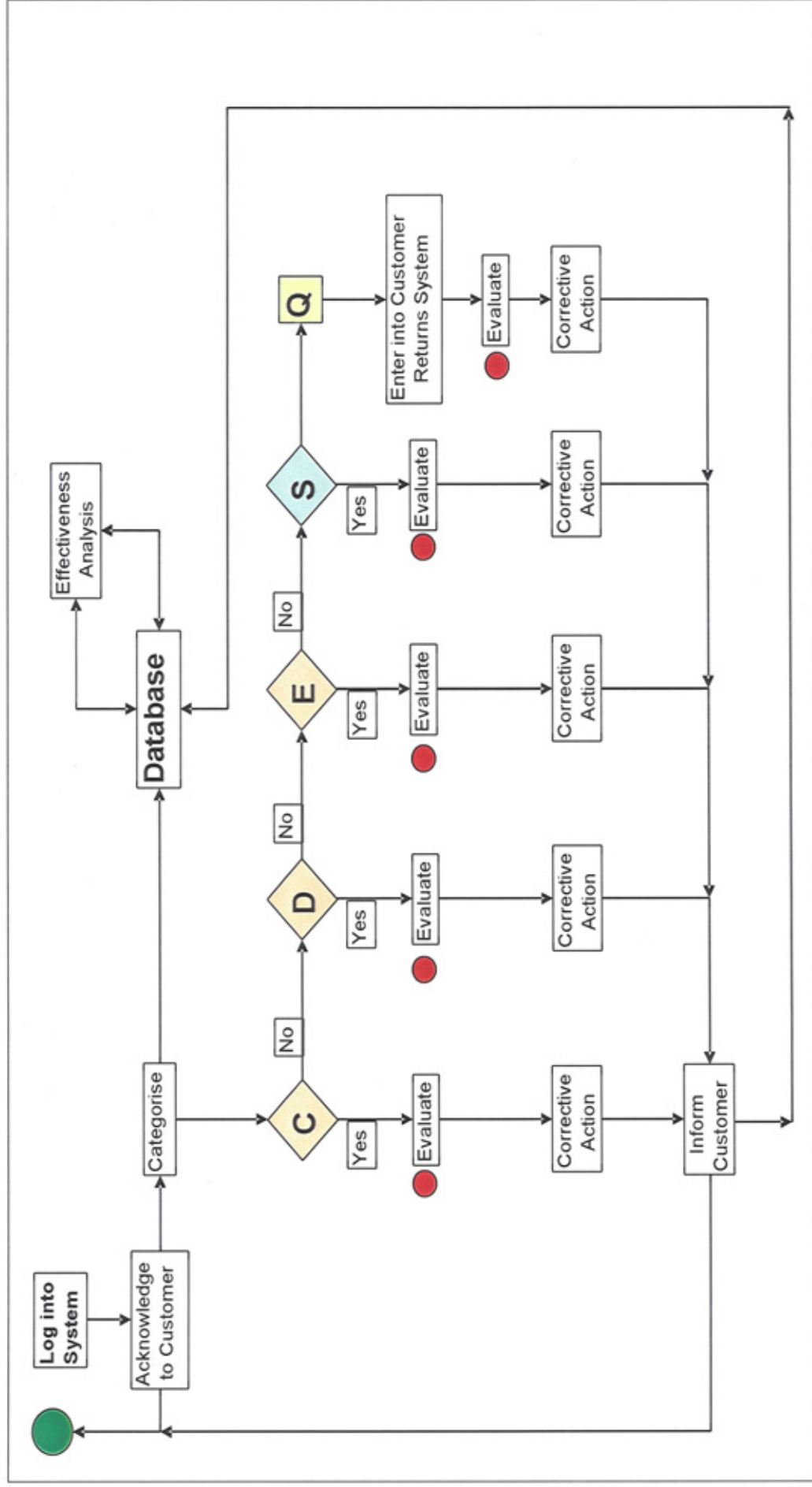


Figure I.3

*A Further Perspective on where a Technology Could be Placed within the Complaints/Concerns 'System'*

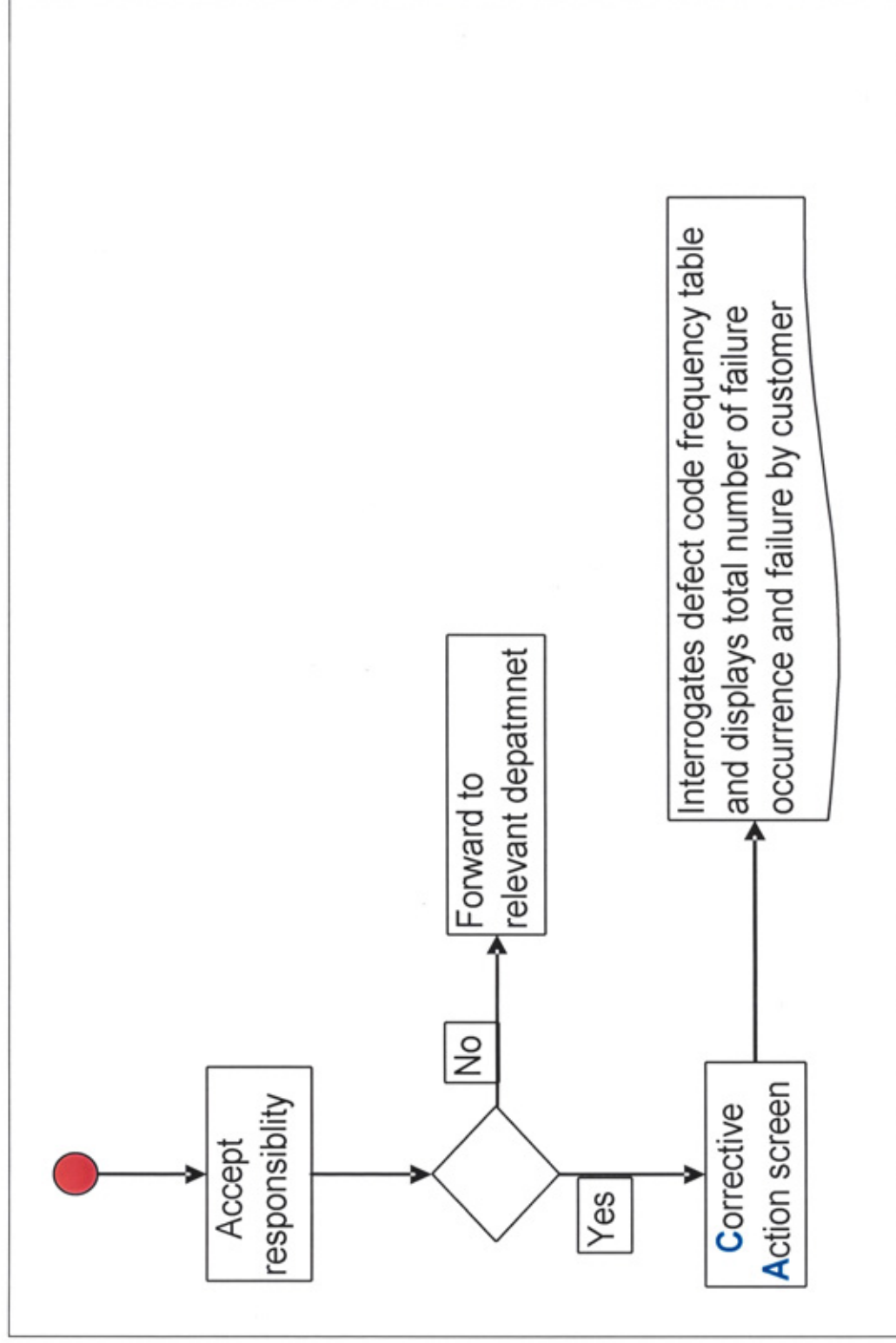


Figure I.4

*A Perspective Investigation into How Complaints/Concerns Could be Handled once they have Entered BreathCo*

## Appendix J – Analysis on the Customer Concerns Technology and its Usage

### J.0 Introduction

Since the training was conducted in July and August of 2004, all participants had used the technology for at least three months. In order to analyse the use of the information system application (ISA), an interview was drafted (see section H.2 of Appendix H). Section three of the interview with the ten participants who had received the training was about their perceptions of the ISA, and sought to investigate how individuals are using the information system (IS). Section four investigated the output the ISA can produce, which would hopefully allow individuals to identify problems and take any corrective action. It is with these issues that focus is placed. During this phase of the project, as outlined through Table 7.1 Chapter Seven, it was not possible to explore the learning theories that could be used to identify where learning is taking place. An explanation of why will now be conducted.

### J.1 Reporting Functions

It was highlighted towards the end of the training that it was hoped that the tools, and reporting functions available within the ISA, were to be used by employees to control the content of their jobs more effectively. To accompany this point, it was also hoped employees could improve the overall organisation by identifying and solving continuous problems. The word template created in Microsoft Word allows a written report to be generated at the click of a button, which can be printed off and sent to the customer. Alternatively, the letter can be saved on an employees PC and sent through an e-mail as an attachment. The Word template places information such as the concern number, what actions are being undertaken, and all the customer's details. The template is also flexible enough to allow an employee to add any extra detail to the letter that is deemed to be necessary.

Along with the Microsoft Word template, the technology is able to provide a number of reporting functions. Reports can be accessed either within the ISA, or by customisable reports that are exported to Microsoft Excel. The reports within the ISA can be seen by: number, status, customer, active by customer, active by responsibility,

complete by customer, customer by name and customer by postcode. Reports that can be exported to Microsoft Excel are slightly different, but include: code, part number, owner, overdue actions and by time active. Once the reports have been exported, they can be altered by an employee, as any other data set could, within the Excel package. All reporting functions can be altered by the four administrators who are the project leaders (the Quality manager, the product performance manager, the customer services manager, and the 2<sup>nd</sup> customer services team leader), who can allow the creation of additional standardised reports if requested or deemed necessary. The reports created have been designed to help individuals identify any areas of weakness within the organisation, or areas where training may be required, as well as identify any trends that are developing. For these processes to take place individuals have to use the reporting functions.

Section four of the interview (see section H.2 of Appendix H) related to the ten individuals who were interviewed because half had used the ISA and the other half had not. It may be deemed a pointless exercise asking such questions to the individuals who were selected because they were not entering concerns. Individuals however, do not have to enter concerns to use the reports. Individuals may also have found using the reports difficult, which may have detracted from the perceived usefulness of the technology. On asking all ten individuals how they have found the reporting functions; a majority of the individuals had not used or looked at these functions. The Quality employee, the customer services technical support employee, the research and design employee, the gas detection supervisor, and the shipping supervisor answered that they did not use these functions. The purchasing employee replied that she had never run any reports, but were aware that they were available. Service co-ordinator 1 was also aware of the functions but did not use them.

The service co-ordinator looked at a few reports on the ISA, but only in relation to concerns dealt with by her, and was quite bemused about the prospect of examining other individuals concerns. The following quote supports this, “[Researcher] so you are just inputting data really? [Service Co-ordinator] Yes. What would I want to do like apart from actually putting data in?” (Interview Transcript with the Service Co-ordinator, December 2004). Upon further exploring this theme, the service co-ordinator accepts that the reporting functions are judged as a management function

when she states, *“team leader or customer services manager, yeah. May be not even team leader, may be just customer services manager and above I think”* (Interview Transcript with the Service Co-ordinator, December 2004). The only individual to answer that they did use the reporting functions is the accountant who uses the ‘all by customer’ report within the technology. The accountant states the reasons for doing this are *“because I don’t always know if I’ve had a concern from a customer, but I possibly remember that there might have been something from this particular customer. So I search for it under customer name. I can see if there’s been one or not”* (Interview Transcript with the Accountant, December 2004). However, not one of the ten individuals interviewed ran any reports into Microsoft Excel.

Question forty of the interview (see section H.2 of Appendix H) asked if individuals had used the Microsoft Word template as part of a concern. Nine of the ten individuals had not, whilst only the service co-ordinator had used the tool twice. This was in the early stages of the ISA, immediately after implementation, and she would require assistance in doing so again. The following question (forty-one) examined if individuals were using any output from the technology within their job role to identify any areas of weakness, or identify any trends that may be occurring. Only a few individuals have used the reports, or the tool, but a majority of individuals had not (eight individuals). Only the service co-ordinator had by using the Word template to write to two different customers. The Quality managers PA, whilst not directly using the reports or the tools, does help compile some of the output in the weekly quality report that gets presented at senior management meetings.

The final question of the interview (see section H.2 of Appendix H) wanted to know if any improvement projects had been started within each of the ten individuals departments, as a result of problems being identified through the ISA. The accountant stated she had not, and was the main user of the technology within her department, whilst both service co-ordinators also implied no improvement projects had been started to their knowledge. The gas detection supervisor, the shipping supervisor, the purchasing employee and the research and design employee also stated they had not started, or knew of any improvement projects started, because of the ISA. The Quality employee was unsure if there had been any improvement projects specifically because of the concerns technology. The customer services technical support

employee was also unsure, as he had not started any projects himself through the technology, nor had he heard of other individuals who were initiating projects. The Quality manager's PA was aware of a couple of storyboards that had been opened (part of the GREAT process) to tackle issues that were a result of using the concerns technology. She was not a hundred percent sure, but stated projects were being conducted within customer services and engineering. It is strange that the Quality managers PA was aware of an improvement project being started in customer services whilst both service co-ordinators were not, as they belong to this department. This may relate to the quality department being involved in most programmes on improvement processes, but this issue is still unclear.

If the data so far is be summarised, not many reports are being used or run. This could be because participants were not aware that this was an aim of the project, or they thought these were for the sole purpose for management. The Word template has also had limited use, but this could relate to customers not requiring an official response from the individuals of the organisation. Only two individuals have used any output within their job role and one of those outputs was the Word template. Finally, only one individual (the Quality managers PA) was aware of an improvement project taking place through the output or issues relating to the ISA. It appears that the improvements that the organisation hoped to achieve may not be having the desired effect. Whilst this project is looking at the learning that can be achieved through designing and implementing an ISA, it was hoped that the learning produced could be extended by using the technology. From the outcomes, it can be considered that if learning is being undertaken in relation to the technology, it is not being undertaken through formally creating reports. As the ten individuals are not using the reporting functions, it has to be asked what perceptions and opinions do the individuals hold in using the ISA.

### **J.2 Using the Customer Concerns Technology**

For individuals to gain the perceived value from the concerns technology, they must firstly use the ISA, and secondly enter the concerns they receive. Table J.1 has been constructed to contemplate these issues.

	How often do you log onto the concern system?	Do you frequently enter concerns?
<b>Employee</b>		
Research and Design Employee	Never	Never
Quality Managers PA	Not very often	Never
Service Co-ordinator	As little as possible	As little as possible
Service Co-ordinator 1	Only to enter concerns	No
Accountant	Every day	Yes
Gas Detection Supervisor	Only to enter concerns	No
Customer Service Technical Support Employee	Not very often	No
Purchasing Employee	Only once	No
Shipping Supervisor	Only to enter concerns	No
Quality Employee	Never	No

Table J.1

*Using and Entering Concerns on to the Information System Application*

Table J.1 has been constructed to provide a quick overview on participant's frequency of use of the ISA. Unfortunately, from this top-level analysis, it appears as if the technology is not being used by a majority of the participants. The researcher however, was able to access the number of concerns recorded onto the database, since the ISA was implemented and had seen an increase in concerns being recorded (Researcher Diary, December 2004). Other individuals, therefore, are using the technology. The participants interviewed could be experiencing difficulties, perhaps problems with the ISA, which could relate to training issues or participants just not perceiving any value in the technology. Figure J.1 has been constructed to investigate this issue.

Figure J.1 demonstrates the perceived value individuals are currently getting from the technology, and what they perceive they will get in the future. The figure as well as investigating these perceptions also serves to demonstrate where each individual is now located on the BreathCo site, since the new building has been built (compared to the open plan office shown in Figure 6.3 in Chapter Six).



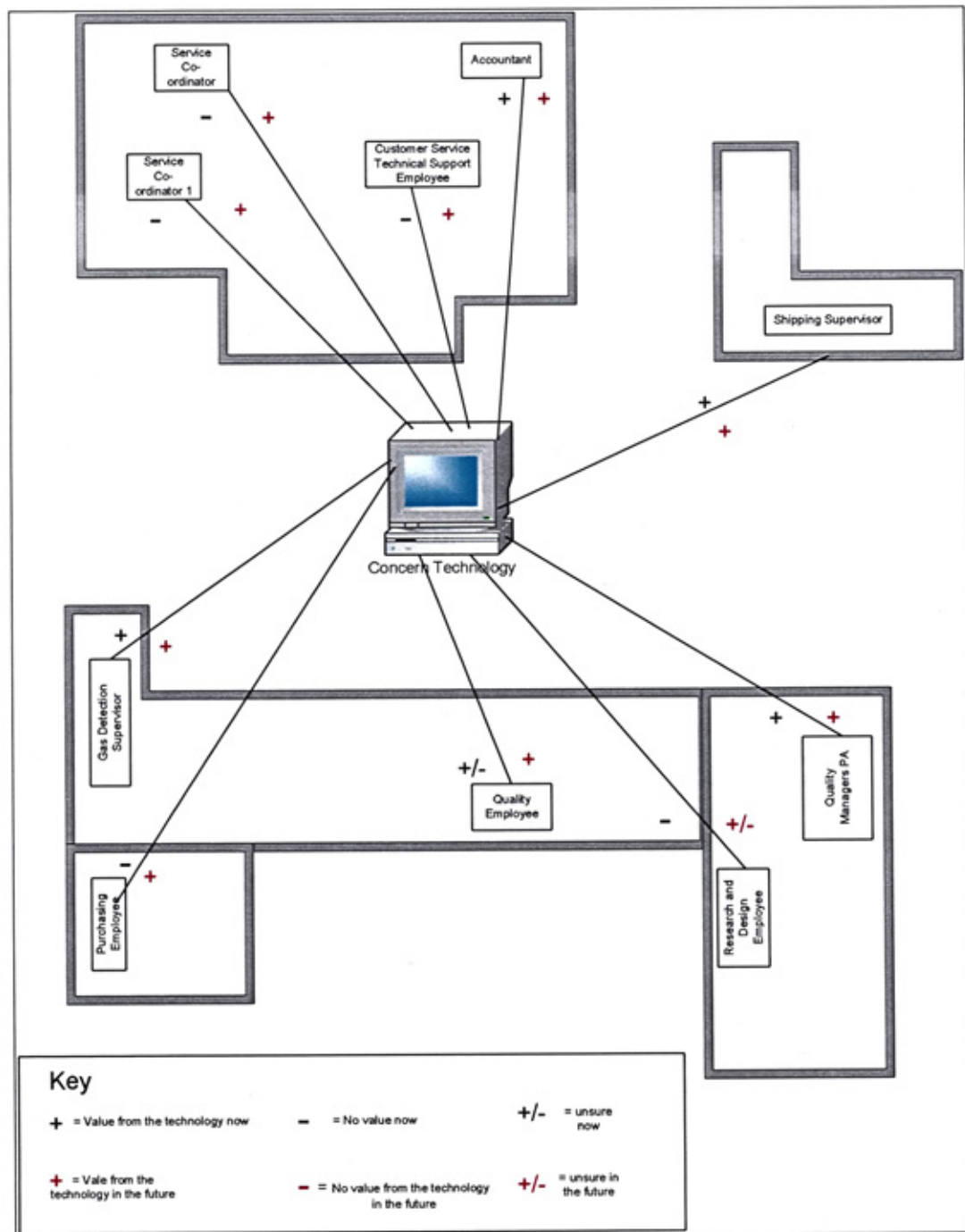


Figure J.1

*Individuals Perceived Value from the Information System Application Now and in the Future*

As this work has adopted a number of learning theories as described in Chapter Three, it remains to be seen how this change may affect the continuous learning that individuals within the organisation could undertake. This issue should really be compared to what they undertook when placed in greater proximity with each other. It was not possible to record this formally. This will be revisited later, but as Figure J.1 has been constructed to see the value individuals are receiving now, and perceive

to receive in the future, it can also serve to initially raise this issue. As can be seen through the symbols attributed to each individual within Figure J.1, five individuals are getting no value from the ISA now compared with four individuals who are; but one individual is unsure. This could answer why individuals are not entering and using the technology frequently. Nine individuals however, perceive they will receive value from the ISA in the future with only one individual unsure (the research and design employee) about the value they will receive in the future. Value therefore, is envisioned as being received in the future, so there may be other issues occurring now that are inhibiting individuals from using the technology. To try to highlight what these issues may be, and why some individuals use the ISA more than others, Table J.2 has been constructed.

Type Of Use	Employee	What Influences Employees to Enter Concerns or Not
High	Accountant	<i>"Customer complaints, queries anything to do with the customer."</i>
Moderate	Service Co-ordinator	<i>"I don't think it's just me, everybody else would say the same, they're not doing concerns the way they should because of the changes upstairs as we haven't got time. Had my job been the way it was previously before, the changes came into effect, I could have done it that would be fine."</i>
	Service Co-ordinator 1	<i>"Not many concerns come to me."</i>
	Gas Detection Supervisor	<i>"Job role [Researcher] job role, which is what exactly? Currently supervising order processing. So I do all the orders but she's [her colleague in gas detection] overtaken me and she receives all the concerns and putting them on herself."</i>
	Shipping Supervisor	<i>"Well the thing is, as I say, if you have got concerns, to get things moving in here you've got to raise it straight away."</i>
Low	Research and Design Employee	<i>"Don't have enough contact with customers."</i>
	Quality Managers PA	<i>"No, because I don't have much customer contact now."</i>
	Customer Services Technical Support Employee	<i>"I wouldn't have any at the moment I think."</i>
	Purchasing Employee	<i>"No because the simple fact is that we've got our own database, but I know that's one of [the project leaders] objectives for next year is to get that onto one database."</i>
	Quality Employee	<i>"I don't have contact with any customers."</i>

Table J.2  
Individual Influences to Enter Concerns

Table J.2 has expanded Table J.1 shown earlier, by grouping each employee according to how often they log on to the ISA and enter concerns, as well as supporting quotes extracted from the interviews. The highest usage comes from the accountant only. Moderate use can be attributed to both service co-ordinators, the gas detection supervisor and the shipping supervisor. The lowest users are seen to be the research and design employee, the Quality managers PA, the customer services technical support employee, the purchasing employee and the Quality employee.

Table J.2 demonstrates that the accountant seems to enter any concerns relating to customers, which is why she classifies herself as logging onto the ISA and entering concerns frequently. Two of the moderate users (the service co-ordinator and the gas detection supervisor) relate current job functions as issues for their moderate usage. The customer services co-ordinator highlights that she is experiencing difficulty due to the job role change that her department has undergone, and states that she does not have the time to enter concerns frequently (cf. Researchers Diary, August 2003). On a similar theme of role changes, the gas detection supervisor has also just moved into that position, and no longer has as much customer contact, which has also attributed to moderate usage. The shipping supervisor has experienced a similar problem to the customer services co-ordinator, in that time issues are an issue in the shipping department. If concerns are not raised immediately, they may not be entered onto the database at all, which is why she does not frequently log onto the technology and only moderately enters concerns. Customer services co-ordinator 1 puts her moderate use of the ISA down to simply to not receiving that many concerns. This leads to the last category of Table J.2, which contemplates low usage.

The most noticeable reason given for low usage (the research and development employee, the Quality managers PA and the Quality employee) relates to having no direct contact with customers. The purchasing employee has another database where concerns are input, so does not bother with the concerns technology. The customer services technical support employee thinks at the moment he would not have any concerns to enter. However, apart from the customer services technical support employee a pattern seems to emerge. The high and moderate user's jobs can be identified as having links that are more direct with customers, whilst the low users roles within the organisation can be seen as supporting BreathCo's main operations

(e.g., quality and purchasing). Therefore, the support employees may only have to help with tasks that have been transferred to them specifically from other front line employees, such as the service co-ordinators and the accountant. To explore this thinking further, Figure J.2 has been developed.

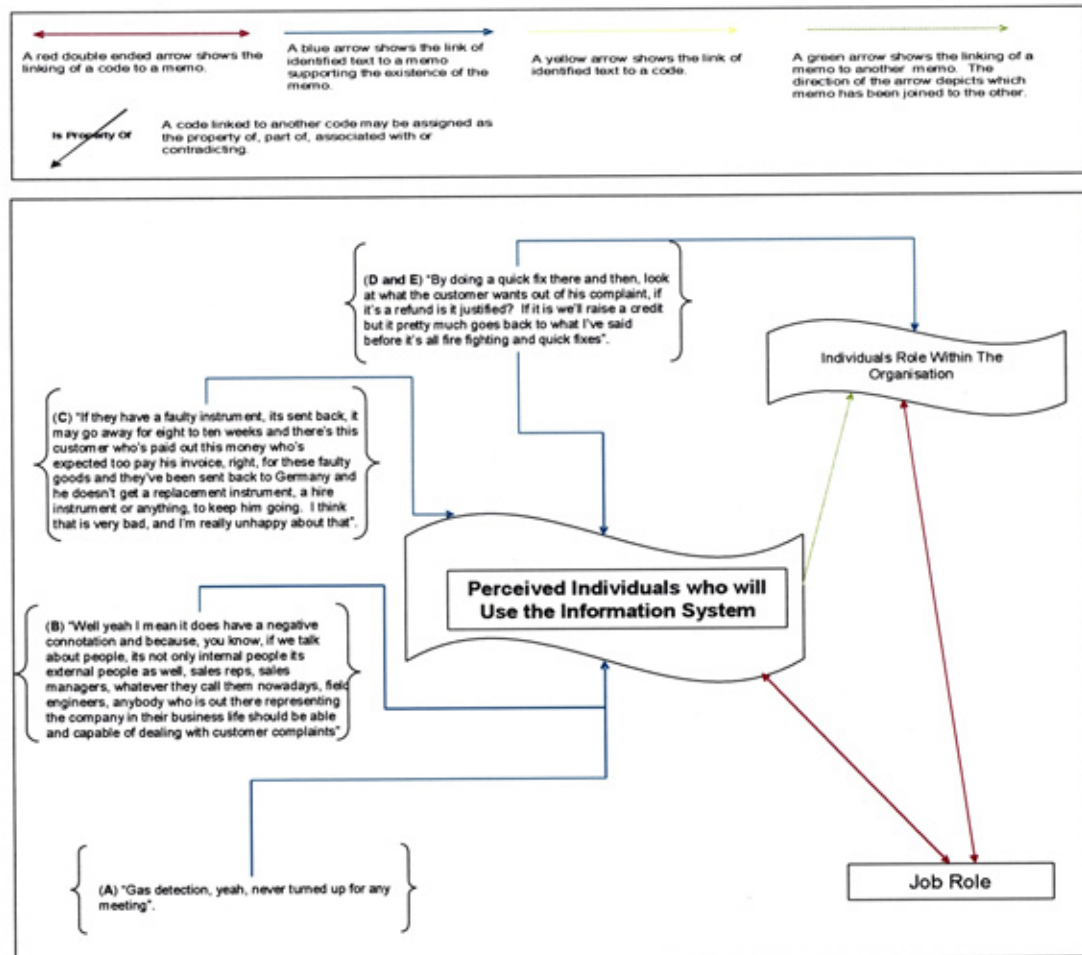


Figure J.2

*A Theory Relating to the Level of Technology Usage*

Figure J.2 displays supporting quotes to the theory relating to perceived individuals who will use the information system more frequently. Figure J.2 is trying to demonstrate that employees who do not have direct contact with customers may not use the ISA as intended. One example implies certain departments did not provide sufficient input into the earlier meetings (link 'A') like gas detection employees (Interview with the Project Leader, December 2004). This could be for a number of reasons, but if these individuals consider the project is only aimed at front line employees this could be a contributing factor. Focusing on front line employees, the product performance manager (link 'B') states from his first interview that he

considers that all BreathCo employees should be able to deal with customer concerns (Interview with the Product Performance Manager, October 2003). The product performance manager seemed to indicate when the problem situation was being explored that anybody who can be contacted by the customer should be able to deal with complaints (which became concerns). This thinking could further support the current lack of use from employees that support BreathCo's operations, as they may not directly deal with customers. The customer services team leader (instrument specialist) also gives an indication of the problems she faces, but she could find value from using the concerns technology to deal with issues as shown by link 'C' of Figure J.2 (Interview with the Customer Services Team Leader, and Instrument Specialist, October 2003). These issues lead to the roles individuals hold within the organisation could relate to how often they would use the ISA.

To explore this thinking of Figure J.2, the figure also shows the code 'job role' that has been applied to quotes where an individual refers to aspects of their jobs. Job role therefore, has been linked to the thinking on which individuals are using the ISA. Also within Figure J.2, another issue can be seen and is similar in nature to the code 'job role'. This memo can be described as a further analysis into an individual's job role and this is argued to reflect an individual's use of the technology. This issue identified all data relating to roles an individual holds within the organisation, which may relate to how the project is perceived and judged. The quote attached to support this comes from the customer services manager (Link 'D' and 'E') referring to how he has to put in quick fixes and other fire fighting measures to solve problems. Participants who are facing similar problems may find more value and use from the ISA, more than participants who are supporting the main operations of BreathCo. It is now possible to examine what other issues and thinking can relate to an individuals role within the organisation. This can be seen through Figure J.3.



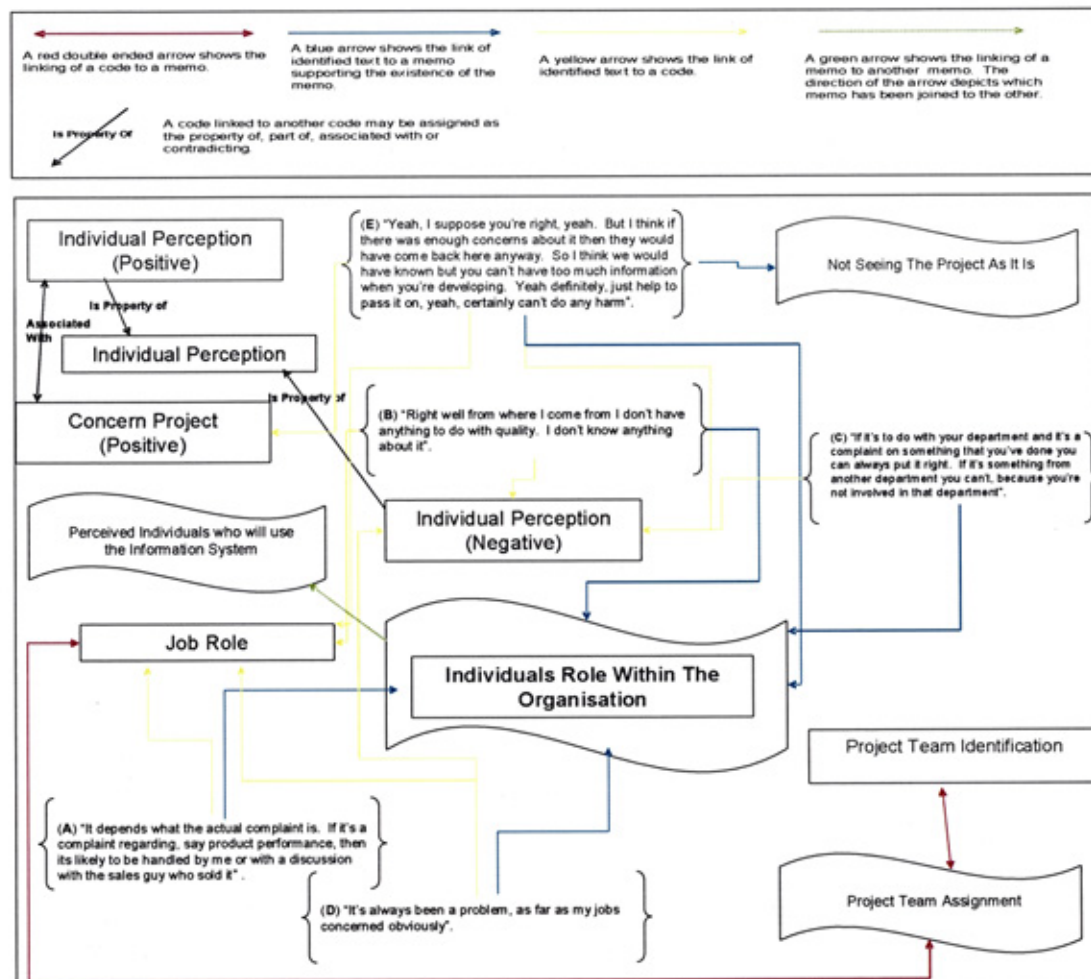


Figure J.3

*A Network Exploring an Individual's Role within the Organisation and How they could Perceive the Information System Application*

Figure J.3, although complicated, demonstrates some important points in the thinking relating to which individuals will use the ISA now it has been implemented. Figure J.2 gave an overview of why individuals may not be using the technology, while Figure J.3 specifically charts individual's roles within BreathCo with codes that can apply to these and other roles. Individuals demonstrating this thinking includes the product improvement manager as shown in link 'A' (Interview with the Product Improvement Manager, October 2003), and the accountant, who displays what can be seen as a negative perception, as she is not interested in other areas outside of her work as shown by link 'B' (Interview with the Accountant, December 2004). Finally, the repair administrator states that individuals can only affect aspects of their own work as shown by link 'C' (Interview with the Repair Administrator, October 2003). The concerns technology was designed to try to highlight to individuals areas of the organisation that are causing problems, as well as inadvertently be causing problems

for other departments. Along with this identification, the ISA can be used to see what other parts of the organisation may be dealing with. It seems as if individuals are not using the technology specifically for this purpose.

As well as providing supporting quotes that refer specifically to individuals focusing solely on their job role, a number of codes are also displayed. These codes will now briefly be explored. As with Figure J.2, Figure J.3 shows the code 'job role'. In Figure J.3, it can be seen to be associated with either seeing the concerns project in a positive or negative way. Figure J.3 also shows that the code 'job role' may also apply to how the project team were assigned to the project, based on their position within the organisation, knowledge and frequent contact with customers, which in turn is connected to the code 'project team identification'. The code 'individual perception negative' is argued to relate to the negative perception an individual has over a programme, process, or job within the organisation. 'Individual perception negative', is linked as a property of 'individual perception' in general, which 'individual perception positive' is also a property of 'individual perception' as perceived by this researcher.

A negative perception comes from the receptionist through the earlier interviews as shown by link 'D' (Interview with the Receptionist, October 2003). The quote therefore, is attached to 'individuals' role within the organisation', the code 'job role', and 'individual negative perception' that the receptionist currently holds over the issue of dealing with concerns. 'Individual perception positive' is thought to be associated with the code 'concerns project positive'. This is thought if an individual may perceive the concerns project positively, which would give an individual a positive perception of the ISA, and as a consequence the individual would hopefully use the technology. An example of this comes from the research and design employee who demonstrates a positive attitude towards the concerns project (even though he does not use the technology as frequently as the project intended) as shown in link 'E' (Interview with the Research and Design Employee, December 2004). Through this quote (Link 'E' of Figure J.3), the research and design employee gives his perception on the project. This relates to his job role within research and development, which is why the links have been made to the code 'job role' and the memo, which is the focus of the network ('individuals role within the organisation').

Whilst the above paragraph and figure (Figure J.3) may be confusing, the analysis just undertaken can be used to support the thinking that front line employees will have more interaction with the ISA. This again is argued through an individual's job role, even if they were not involved in the design and implementation of the ISA.

Depending on their perception of the technology, it could relate and influence usage. Support employees compared to the front line employees are thought to only glance at the database when they receive an e-mail reminder that a concern has been transferred to them, as a consequence of the design of the technology and hence the 'system' may or may not have intended. As support employees do not have much customer contact, they are not actively seeking concerns, and wait for issues they can help with to come to them, before they complete the tasks and transfer the concern back to the correct individual to inform the customer of the outcome. Their perceptions of the ISA therefore, may be different to front line employees, due to them not interacting as frequently with the technology. The only problem with this thinking comes from the customer services technical support employee as set out below.

It is strange that the customer services technical support employee, who has to have regular contact with customers when providing them with technical support, does not receive concerns. As suggested by Miles and Huberman (1994) any variable that does not seem to fit a proposed pattern needs to be investigated further. Further analysis on why the customer services technical support employee "*would not have any [concerns] at the moment*" (see Table J.2) needs to be undertaken. The researcher examined where most concerns came from previously, before the introduction of the ISA, and once the technology had been introduced. This thinking related to mental models held about concerns in general. If these mental models could not be tested (cf. Senge, 1990; Senge et al., 1994), participants may think nothing has changed and hold the same perspective. The ISA could allow individuals to test these mental models, and alter their perceptions from what they could identify within the technology. As has been found in the previous section, little use of the reporting functions is being undertaken. Two networks were constructed in ATLAS.ti, with the answers to the questions being where each individual believed most concerns came from before and after the introduction of the technology. This data was identified in the transcripts and attached to two memos. As too many quotations were identified to display the findings from the network, data has been condensed and refined in Table J.3 below.



Table J.3, is similar to Table J.2, and shows the answers to both questions, relating to departments causing concerns, for all ten participants interviewed, along with their usage of the ISA.

Type Of Use	Employee	Departments Believed to be Causing Concerns Before the Introduction of the Technology	Departments Believed to be Causing Concerns After the Introduction of the Technology
High	Accountant	Customer services.	Customer services.
Moderate	Service Co-ordinator	Deliveries and stock.	Deliveries and stock.
	Service Co-ordinator 1	Accounts.	Shipping.
	Gas Detection Supervisor	Shipping and accounts.	Accounts.
	Shipping Supervisor	Customer services.	Customer services.
Low	Research and Design Employee	Current Customers.	Unable to answer due to not using the system.
	Quality Managers PA	Sales and marketing as they mainly deal with customers.	Customer services within sales and marketing.
	Customer Services Technical Support Employee	Gas detection.	Gas detection.
	Purchasing Employee	Customer services.	Customer services.
	Quality Employee	Unable to answer.	Unable to answer.

Table J.3

*Perceived Departments Causing Concerns before and after the Introduction of the Information System Application*

Table J.3 demonstrates the perceptions that each of the ten participants regarded as causing the most concerns before and after the ISA had been introduced. Six individuals stated the same department was causing the most concerns before and after the technology had been introduced. Three of the participants (the purchasing employee, customer services technical support employee and the Quality managers PA) were low users, so may have missed the opportunity to investigate their current perceptions, and challenged their mental models. The Quality employee was unable

to answer both questions further supporting the theory that support employees are not concerned with customer issues unless they have to be. The research and design employee states that current customers are causing the most concerns. This thinking may relate to potential customers, and previous customers the employee has to deal with as part of his function in designing new products. The research and design employee was also unable to answer the question relating to after the ISA had been introduced.

Moving onto the moderate users, only two participants (the shipping supervisor and the service co-ordinator) held the same perspective before and after the ISA had been introduced. The gas detection supervisor slightly changed her perspective from shipping and accounts to accounts only, while in comparison, service co-ordinator 1 previously considered accounts were causing the most concerns but now thinks the concerns are coming from shipping. The highest user, the accountant, also held the same perspective that customer services were responsible for the most concerns before and after the introduction of the ISA. As has previously been demonstrated, the accountant only uses the technology for her own concerns and to search for a customer by name only, and may be missing a chance to test and alter her mental model based on other data and reporting functions available.

What is important to highlight from Table J.3 is firstly, that the moderate to low users, by not using the reporting functions sufficiently, have stopped most of the users from testing their mental models about which departments are causing the most concerns, as well as identifying any trends that have contributed to this. The highest user, the accountant, along with the service co-ordinator, are only concerned with their own concerns. This issue has also stopped both participants from challenging their mental models, as the main focus is only on inputting concerns onto the database, and participating in a form of automating (cf. Zuboff, 1988). Secondly, if the theory is correct, that the highest users of the ISA have direct links with customers, then the support employees may perceive the department that has passed the concern on to them as the originator of concerns, and not see that in the end, the customer's problem and the category of concern are important. Taking a systems perspective on concerns may help these individuals. This however, is not currently being undertaken. In spite of whether this thinking is indeed correct, or could be applied to other users within

BreathCo, it is important to try to identify why these missed learning opportunities are occurring, as well as not testing any mental models held. To do this attention will turn back to the highlighted deviant case of the customer services technical support employee.

The customer services technical support employee assumes that gas detection is causing the most concerns before and after the introduction of the ISA. As has been demonstrated through Tables J.1, J.2, and the previous section on using the reports, this thinking was not arrived at through using the concerns technology to confirm this mental model. The customer services technical support employee could assume that concerns should only be entered when they relate to his area of responsibility, which is providing support to customers. It has to be considered therefore, that this participant has become confused over some issues of the project. Further, into the interview, the customer services technical support employee refers to confusion in the language that has been developed with relation to the new title of the project. He refers to dealing with forms of complaints. He states,

*“the top and bottom of it, if customers were complaining all of the time, like I say, its sort of like, it’s a little bit complaining but its sort of like different people saying, well I’ve got this product now I find its not suitable, what’s the difference? It’s not a complaint it’s more like a comparison”* (Interview Transcript for the Customer Services Technical Support Employee, December 2004, emphasis added by the researcher).

From this statement the customer services technical support employee believes he does not have any concerns. This relates to the customers he deals with who are not concerned about issues. These customers either have purchased a product deemed unsuitable, and he receives a few complaints, or the problem relates to the gas detection side of the organisation, and he is leaving these issues to gas detection individuals. The language of concerns seems to be different to the language of complaints, which may be the cause of confusion. The design of the ‘system’ was initially undertaken to ‘implement a system to handle complaints’ which may not translate easily and incorporate the same thinking to ‘implement a system to handle concerns’. The training given instructed employees that any concerns received, even

though they may not relate to that employee's work, should be entered onto the database, and transferred over to the individual whose responsibility the concern belongs to. The customer services technical support employee is not undertaking this task, so it is important to discuss why, as well as if the other nine individuals state similar experiences. This will be undertaken in the next section on what concerns are being logged.

### J.3 Logging and Following up Concerns

The previous sections analysis identified that individuals were using the ISA for automating and not for informing (cf. Zuboff, 1988). If this is actually the case, it is important to find out how concerns are logged, and if concerns are followed up to see if customers are satisfied. Issues such as these could provide further learning opportunities. This can be seen through one of the initiatives in undertaking the project, relating not only trying to improve the organisation, but also to increase customer satisfaction. This question was put to the participants. Following a similar pattern as previous sections, the five participants who were not using the ISA could not be sure that this practice was being undertaken. Comments ranged from "*I believe so*" (the Quality employee) to "*I couldn't give a definite yes or no*" (the purchasing employee). The customer services technical support employee dealt with a concern and had a further three phone calls relating to the concern and has not heard anything since. The research and design employee pointed towards the ISA to inform him if a customer is not satisfied. The employee was unsure how the technology would do that, but accepts that the employee dealing with the customer should ring them back, but only assumes that this practice takes place. The Quality managers PA was also unsure, but appreciates that other people are following up their concerns. The five individuals who were selected because they had entered concerns onto the database were also not fully sure. Service co-ordinator 1 assumes concerns are not followed up, while the gas detection supervisor and the shipping supervisor were also unsure. The accountant and the service co-ordinator, however, do believe concerns are followed up. It is unknown due to the way the IS was designed, as only individuals taking 'ownership' not those purely having 'responsibility', can follow up the concern using the technology. From this, the implications of being an 'owner' of a concern may not be fully understood. Second to this point, the language that was developed with relation to 'ownership' and 'responsibility' may also be confusing employees.

Similar to data that could be found through the reporting functions, the types of customers that are being logged are also important, as any outcomes would benefit this group of individuals. At the design stage, the majority of the project team's focus was mainly on logging concerns from external customers. This is highlighted through the 'O' aspect of the constructed CATWOE analysis (see Checkland, 1993; Checkland and Scholes, 1990). Whilst this analysis was not formally presented, it was discussed and agreed by the participants that made up the team. However, now the ISA has been introduced this may have in some way changed. Data has been extracted from the interviews and is shown in Figure J.4 to look at this.

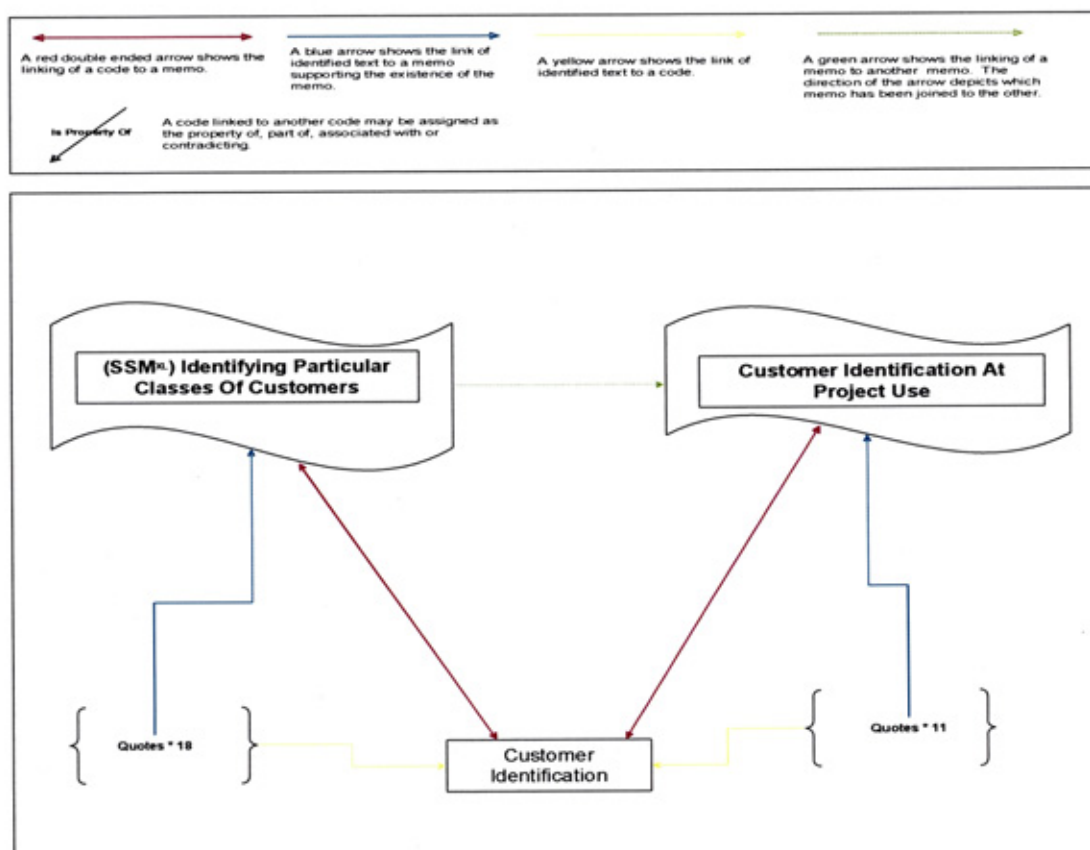


Figure J.4

*A Comparison of Customers Envisioned to be Logged at the Design Stage with what Customer Classes are Actually Being Logged*

Figure J.4 contained a lot of quotations that demonstrates the thinking at the design stage, compared to what particular customer classes the ten participants are logging. From this figure and through the CATWOE analysis extracted during the design stage, it was identified that the project would mainly serve external customers, or

## Appendix J

### Analysis on the Customer Concerns Technology and its Usage

more precisely individuals who purchase products or services from BreathCo. The ten participants interviewed are mainly following this thinking that was introduced at the design stage but with a slight variation. The accountant, both service co-ordinators, the gas detection supervisor and the purchasing employee are logging concerns from external customers. Not formally revealing the CATWOE constructed, or through the participants undertaking this task themselves, which customers should be logged on to the database may have slipped the teams mind, when they were constructing the models for a 'system' to solve complaints/concerns. Both service co-ordinators also stated they were logging internal customer concerns also. The Quality employee, the customer services technical support employee, the research and design employee and the Quality managers PA could not answer the question through a lack of usage of the ISA.

To summarise the analysis from this section on following up concerns, the particular classes of customers being logged on to the ISA, and the particular concerns being logged, Table J.4 is used.

	Do you know if concerns are followed up to see if they have been satisfied?	What particular customer classes are logged onto the system?	What types of concerns are being logged onto the system?
<b>Employee</b>			
Research and Design Employee	System should flag this up	Unable to answer	All
Quality Managers PA	Unsure but other people are	Unable to answer	All
Service Co-ordinator	Yes	External and internal customers	All
Service Co-ordinator 1	No	External and internal customers	Late delivery
Accountant	Yes within department	External customers	Mixture
Gas Detection Supervisor	Not sure	External customers	Small concerns
Customer Service Technical Support Employee	Unknown	Unable to answer	Unable to answer
Purchasing Employee	Unsure	External	Big and small complaints
Shipping Supervisor	No idea	Unable to answer	Small concerns
Quality Employee	Believes so	Unable to answer	All

Table J.4

*Summary over Following up Concerns, Customers Logged, and Types of Concerns  
Logged*

This section has reviewed a number of issues relating to ten trained users of the customer concerns technology. Issues have been explored relating to using the reporting functions, entering concerns onto the ISA, along with investigating each participant's usage of the technology, and the perceived current and future value that they will receive through the technology. The analysis so far has explored specific issues of the ISA. Whilst drawing out participants contact with customers as an issue contributing to why usage may or may not be as high as the project team had hoped, the overall features relating to the use of the ISA can be seen in Figure J.5.

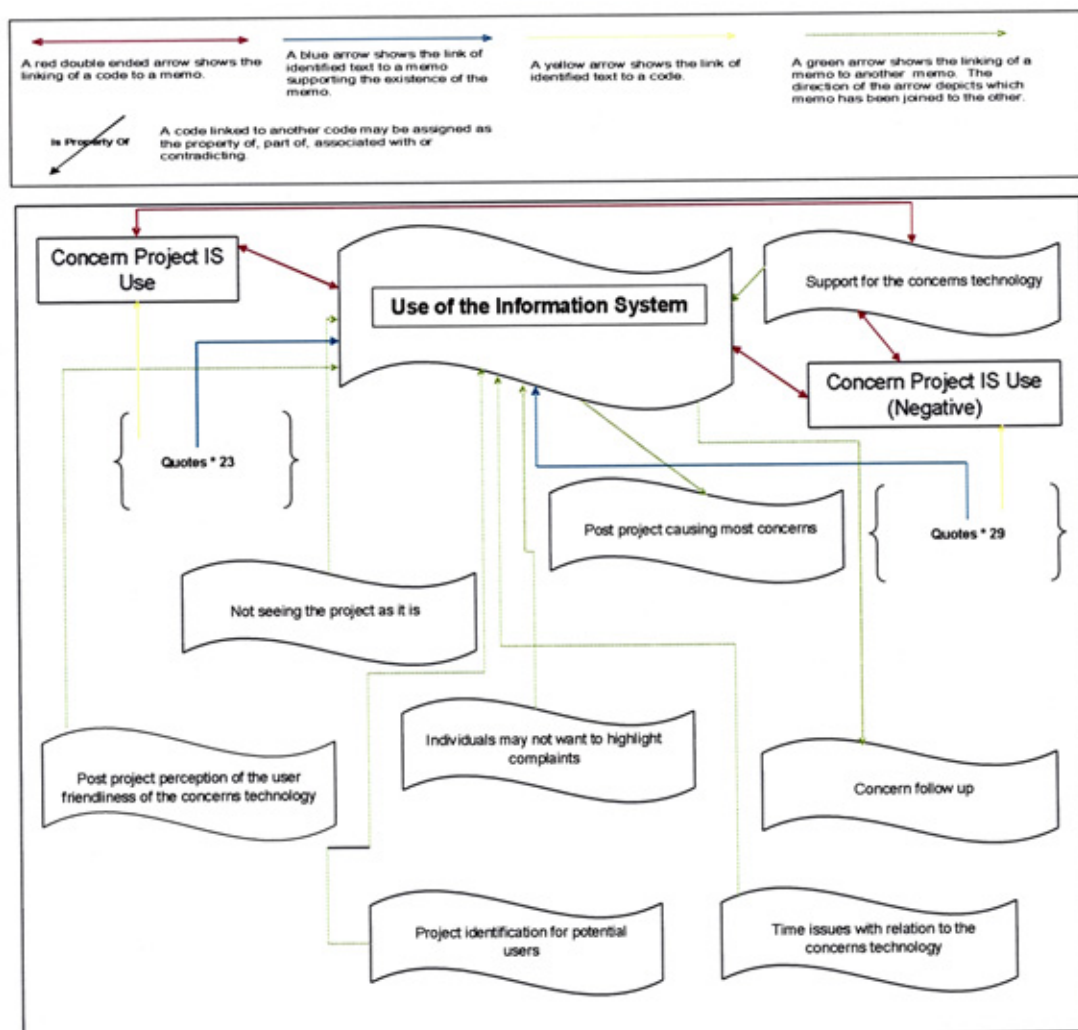


Figure J.5

*Features of Using the Information System Now that it has been Implemented*

Figure J.5 can be considered complex but tries to demonstrate the number of issues participants stated with using the ISA overall. The quotes located to the left of Figure J.5 (labelled as showing 23 quotes) whilst not shown, are issues that may either be neutral or positive, and have been attributed to using the technology through the code

'concerns project IS use'. The quotes located on the right of Figure J.5 (labelled as showing 29 quotes) are also not shown, and display what participants consider negative issues in using the ISA, which are attributed to the code 'concerns project IS use negative'. These issues may contribute to the lack of use participants find with the technology. As well as the main memo (use of the information system) that all quotes and codes are linked to, there are other memos that relate to the use of the technology. For example, if participants do not see the project as it was designed to be, they may not perceive the value the technology could bring, or not want to highlight concerns. These individuals therefore, may consciously avoid using the ISA. If the wrong participants were identified for the training, or there is no real support for the concerns technology, it could all influence participants use of the ISA. If participants are using the ISA, participants may be able to follow up, or know if concerns are followed up, as well as see if any departments are causing a lot of concerns. Acknowledging these issues may allow projects to be undertaken between departments to try and eliminate these concerns from the organisation. Some of the neutral comments and negative comments relating to using the ISA can be seen in Table J.5. A number of these issues have been touched upon throughout this analysis, but Figure J.5 and Table J.5 brings a variety of these issues together.

Neutral And Positive Comments	Negative Comments
Service Co-ordinator. <i>"Its snow balled you see because now we're putting returns on it as well, customer returns, now"</i> (December 2004).	The Research Design Employee. <i>"I've had no interaction with the system since it was implemented, that was something that I mentioned during the training. That sort of call doesn't come into me even though it may do. So I do need the training"</i> (December 2004).
Shipping Supervisor. <i>"You can just actually look back on the history of it. [Researcher] do you feel that link was there before? [Shipping Supervisor] definitely not because everybody would actually come back through here and we'd have to search through documents and paperwork"</i> (January 2005).	The Service Co-ordinator. <i>"I don't think it's just me everybody else would say the same, they're not doing concerns the way, the way we should because. Because of changes upstairs anyway, we haven't got time"</i> (December 2004).
Accountant. <i>"[Referring to use of the technology] everyday or most days"</i> (December 2004).	The Purchasing Employee. <i>"[Researcher] did you get a training tile on your... [The Purchasing Employee] I did but I didn't use it"</i> (December 2004).
The Research and Design Employee. <i>"[Researcher] did you get a training tile on your desktop? [Research and Design Employee] yes I've got that on now"</i> (December 2004).	The Accountant. <i>"[Speaking about concerns that are waiting for a response from somebody else within the organisation] I wouldn't say in my experience that the, the return on those concerns is always as it should be, or as I would expect it to be"</i> (December 2004).

Table J.5

*Neutral/Positive and Negative Comments about the Implemented Concerns Technology*



What can be seen through Figure J.5 and Table J.5 is that the participants who were identified as using the ISA, and the participants who were not; both demonstrated positive and negative issues towards the technology. All participants perceive they will get value from the ISA in the future as shown in Figure J.1. The problem becomes investigating why the future holds a better prospect in comparison to now. One issue could relate to how the technology was designed and implemented, and involves the SSM<sup>XL</sup> framework. Whilst these issues have been raised the hoped identification of learning through the use of the ISA has posed problems. For example, as the technology that was implemented focused on capturing specific data, a 'place' where problems and other issues can be discussed is not located within the technology. This can be demonstrated through Figure J.6 which is a screen shot of a concern.

Customer Concern - 653 ACTIVE

Contact:  Customer:  Telephone:

Action Due: 17/01/2005 Owner:  Responsibility:

Concern Details | Customer Details | Reporting Info

Concern Code:  ERROR Priority: ☐ 1 Days ☐ 5 Days ☒ 3 Days ☐ 15 Days Acknowledged: ☐ Yes ☒ No

Order No:  Customer Order No.: 44917 Invoice No:

Part Number:  Description: TUBE Product Related: ☐ Yes ☒ No

No. Ordered:  No. Concern: 7 Serial Number:

Customer Concern: I contacted  in good time (1.1am) in morning, they came back in afternoon to say they had packed goods and would not take out of package

Date	Time	Concern Action	Responsibility
14/01/2005	08:55	Forward Concern to <input type="text"/> by <input type="text"/> Please raise credit for this one-tubes where sent from <input type="text"/>	<input type="text"/>
14/01/2005	08:53	Raised return 66 <input type="text"/> 130 on d <input type="text"/>	<input type="text"/>

Corrective Actions

Figure J.6  
*An Example of a Concern within the Technology*

The 'place' where issues relating to problems can be discussed may be seen through 'concern actions' (see Figure J.6). This highlights to the second problem identified, that only the individual who has 'responsibility' for the concern can add comments.

This automatically restricts the contributions that other individuals could make. With these learning activities being restricted on-line, they may be undertaken within BreathCo, but it was impossible to identify where. These processes were not explored due to the final phase of the project investigating how participants are using the ISA now, and what future plans the project team have for the technology. For example, 'learning' as stated by Vygotsky (1978) could be undertaken through an individual from customer services entering the ZPD with an individual from product development on issues concerning a product that customers were 'concerned' about. Using the learning the individual from customer services obtained, they may be able to solve the current and future customer concerns on this particular issue. The concern however, would be closed off as complete with no reference to this learning taking place within the ISA. Other individuals therefore, may not be aware of the process and how the solution was resolved.

## Appendix K – Networks and Diagrams Associated with the Use of the SSM<sup>XL</sup> Framework, How Improvements could be Made to BreathCo, and Issues Relating to Technology Management

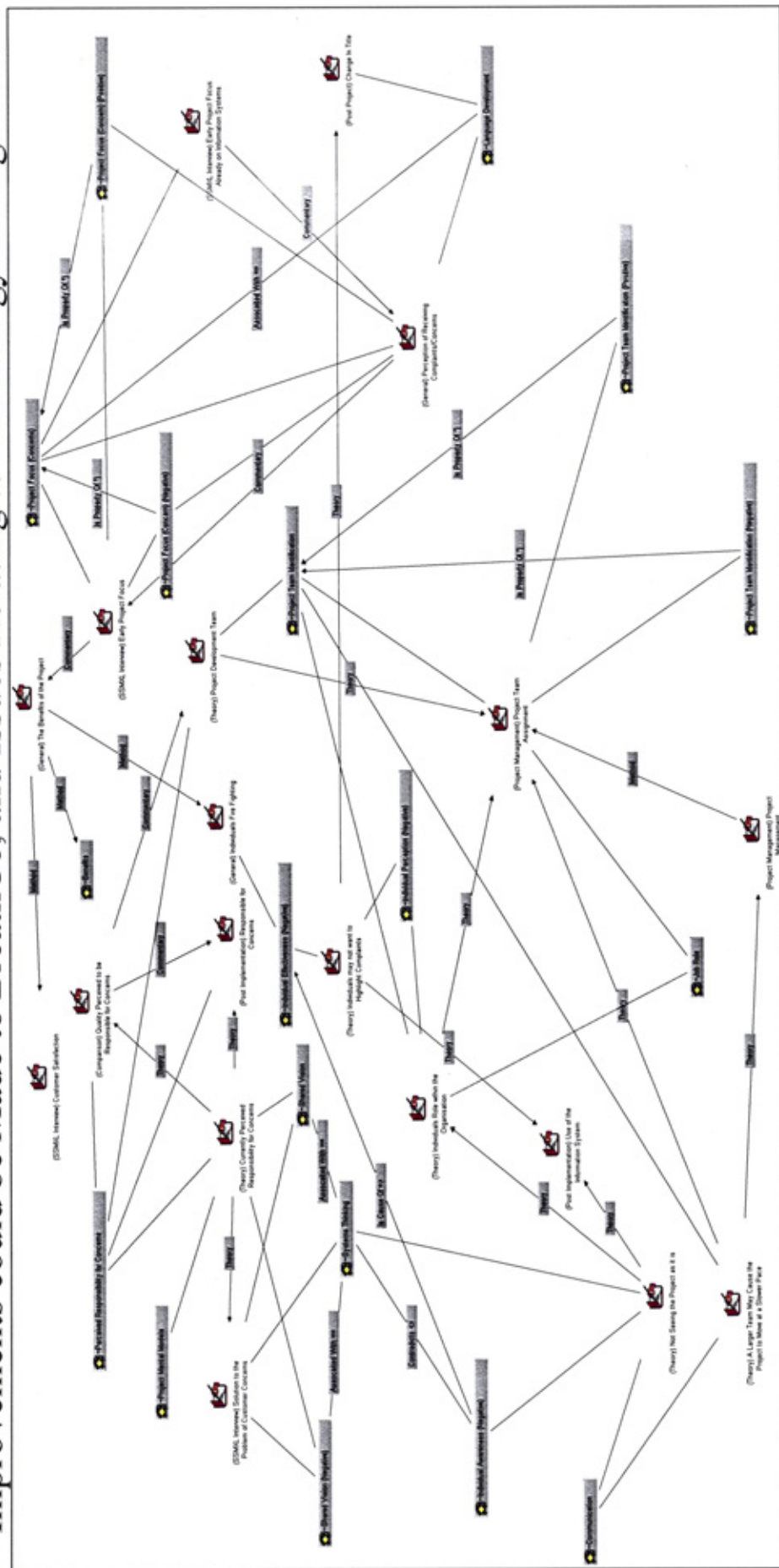


Figure K.1  
A Network to the Issues that were Uncovered through Using the SSM<sup>all</sup> Framework

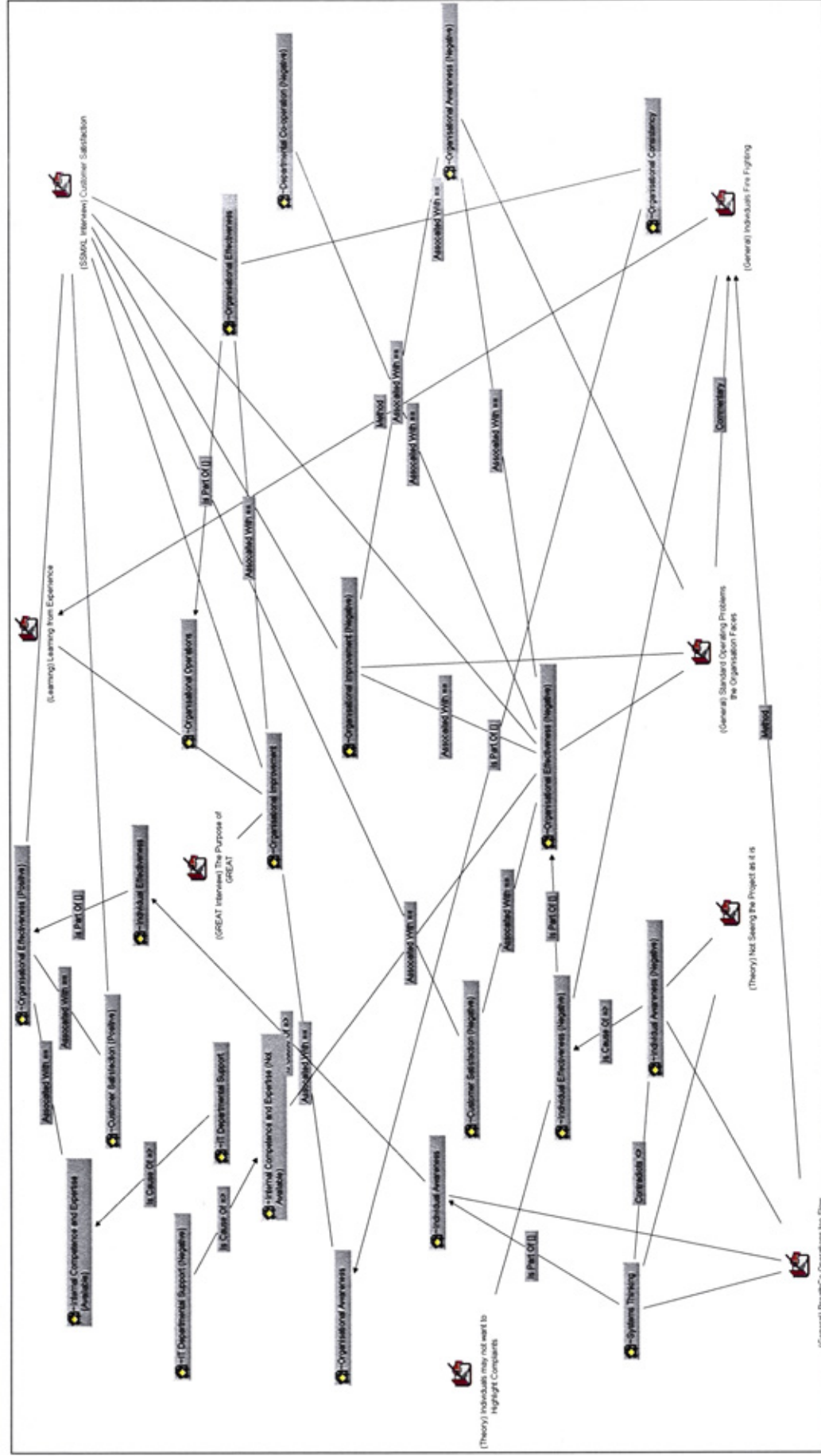


Figure K.2  
*A Proposed Organisational Improvement Framework Based on the Customer Concerns Project*



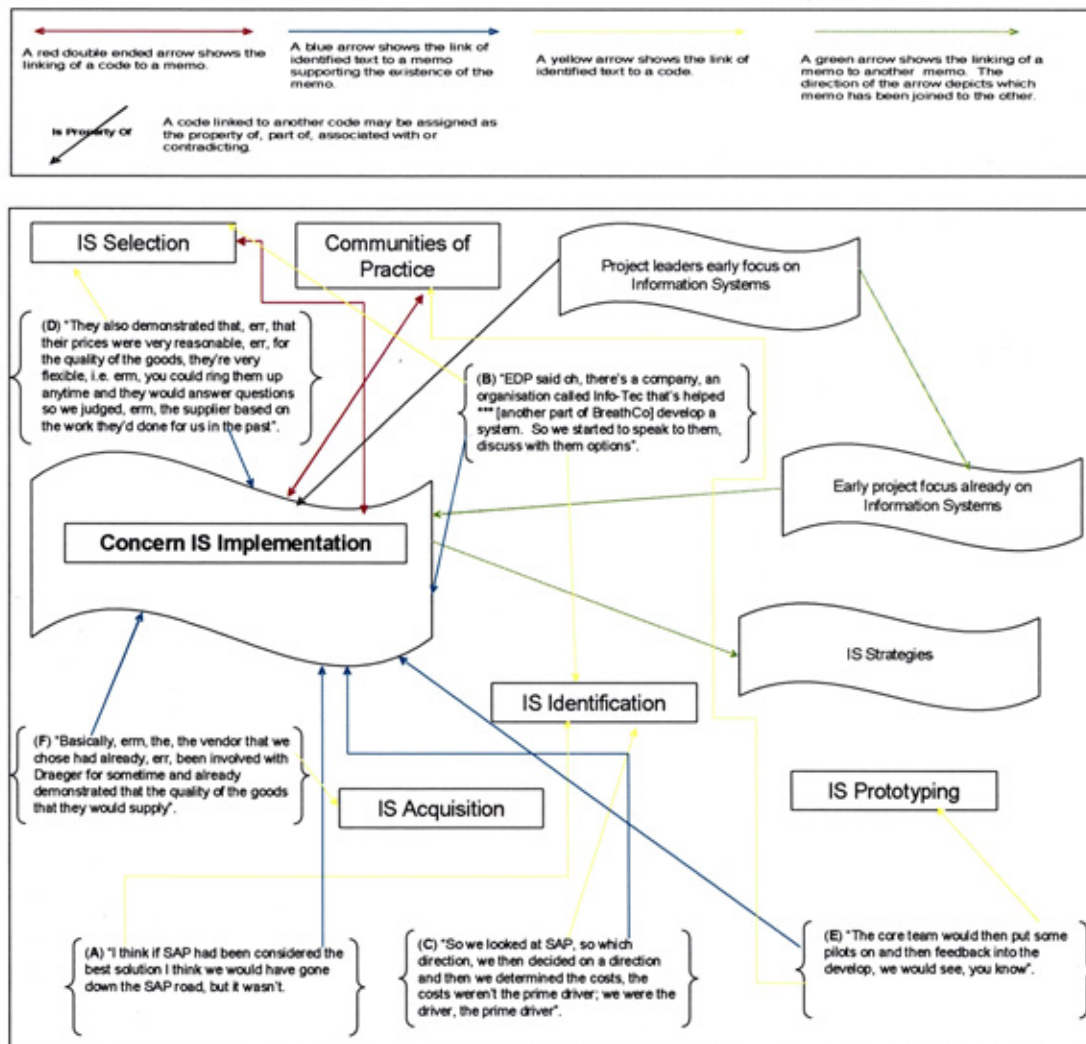


Figure K.3  
*Identifying, Selecting and Acquiring the Concerns Technology*

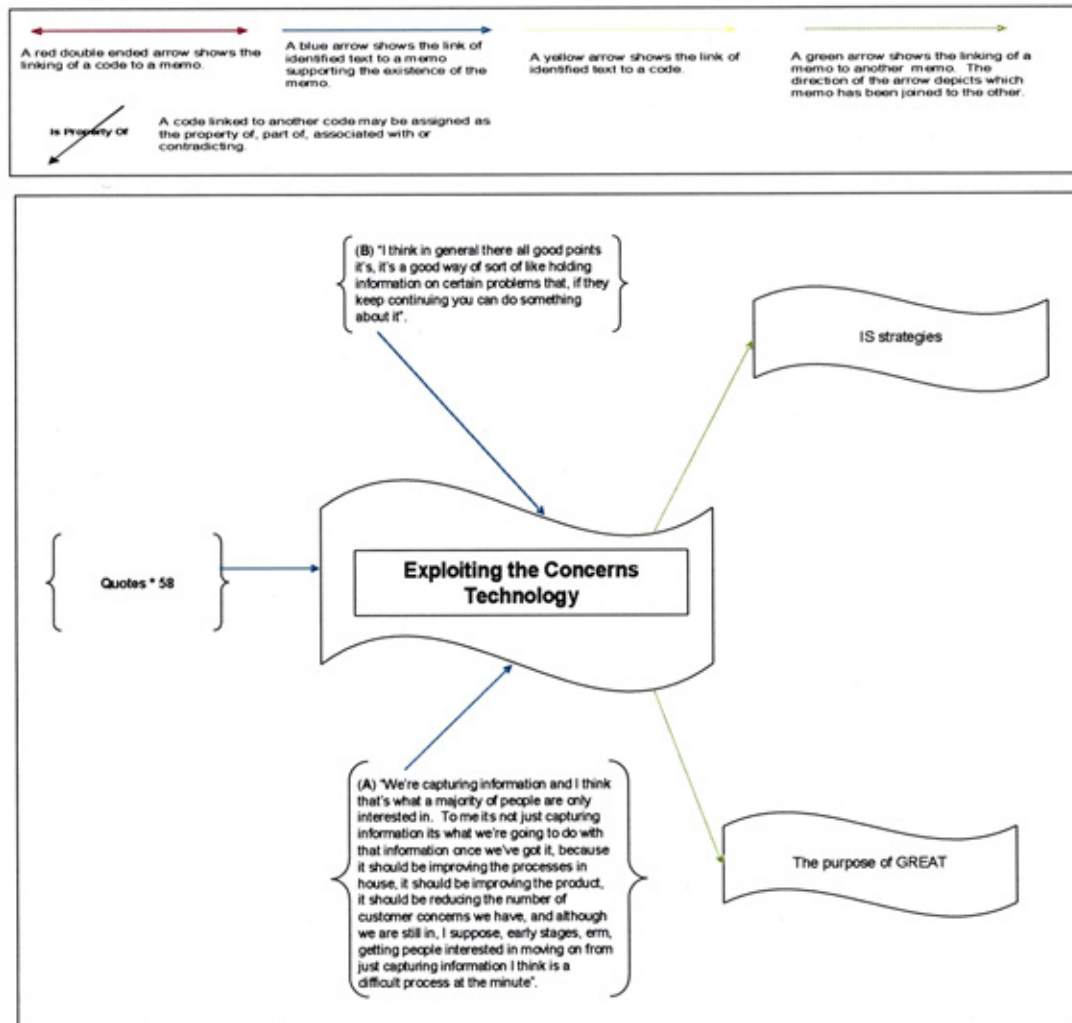


Figure K.4  
*Exploiting the Concerns Technology*

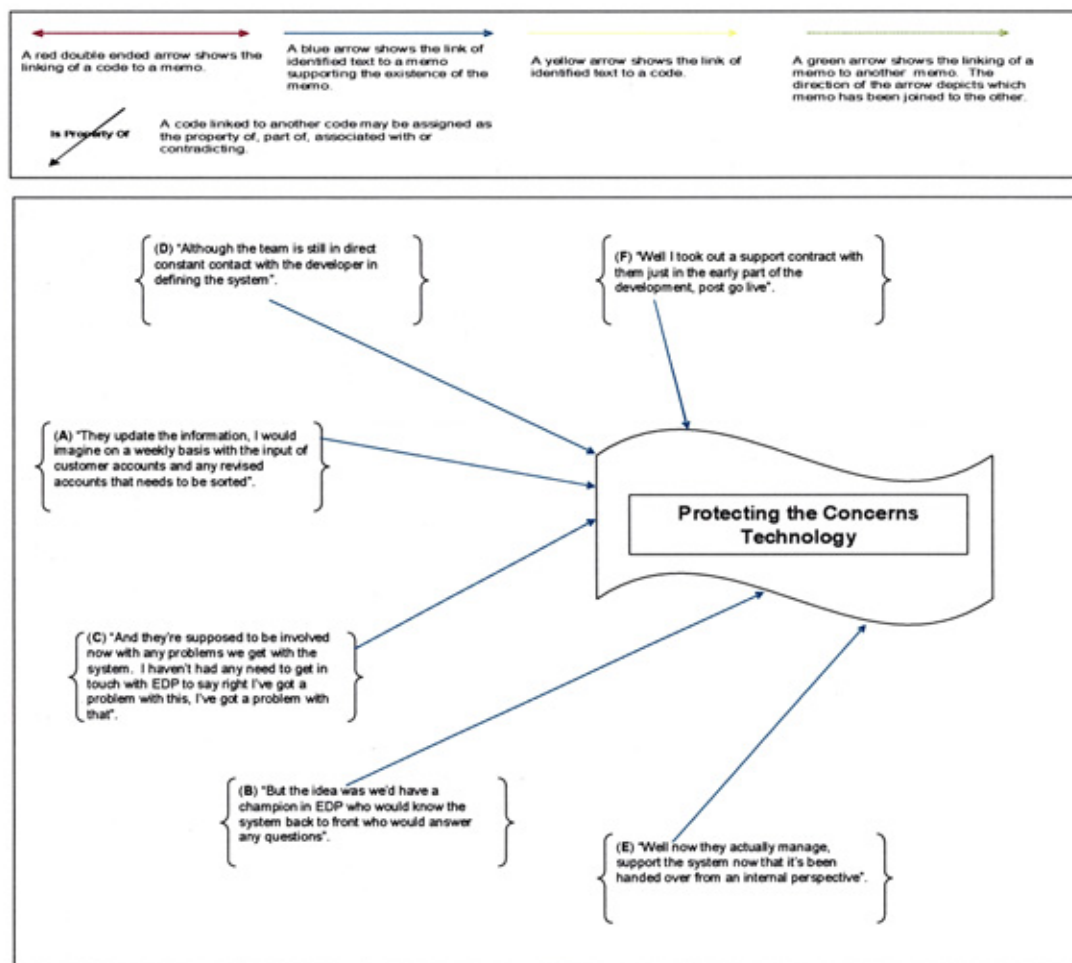


Figure K.5  
Protection Issues Relating to the Concerns Technology





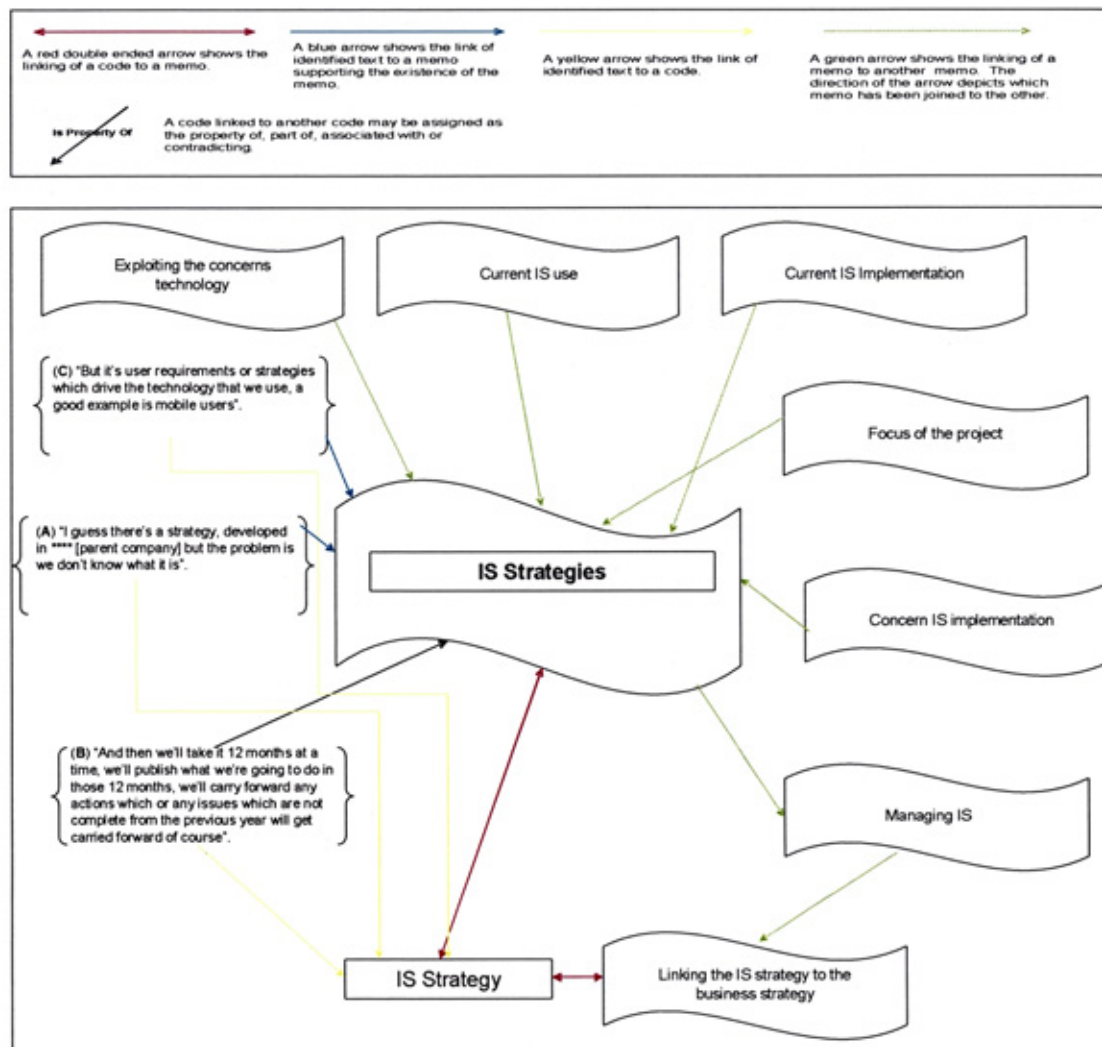


Figure K.7

*The Concerns Technology and its Relation to BreathCo's Information Systems Strategy*

## Networks and Diagrams Associated with the Use of the SSM<sup>XL</sup> Framework, How Improvements could be made to BreathCo, and Issues Relating to Technology Management

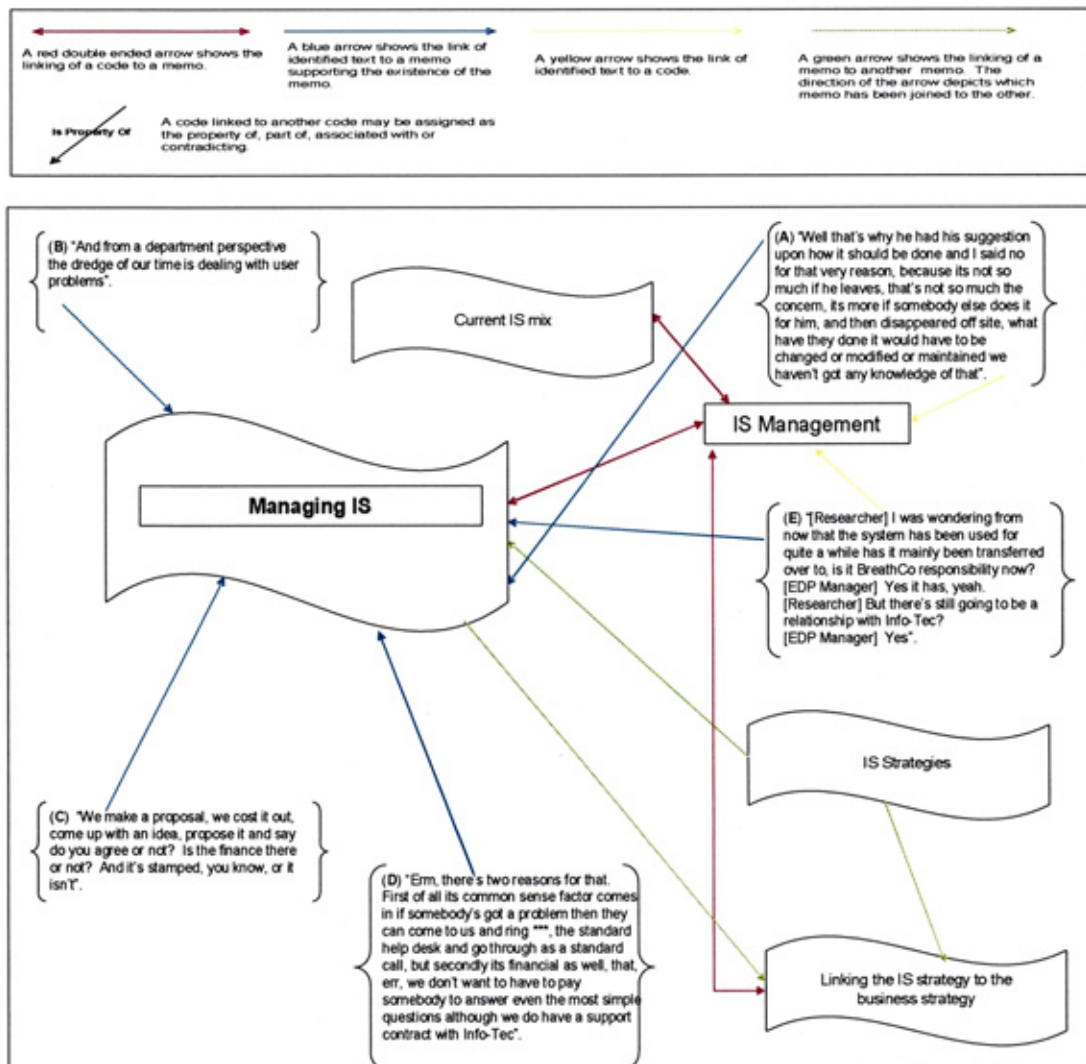


Figure K.8  
*BreathCo's Management of Information Systems*

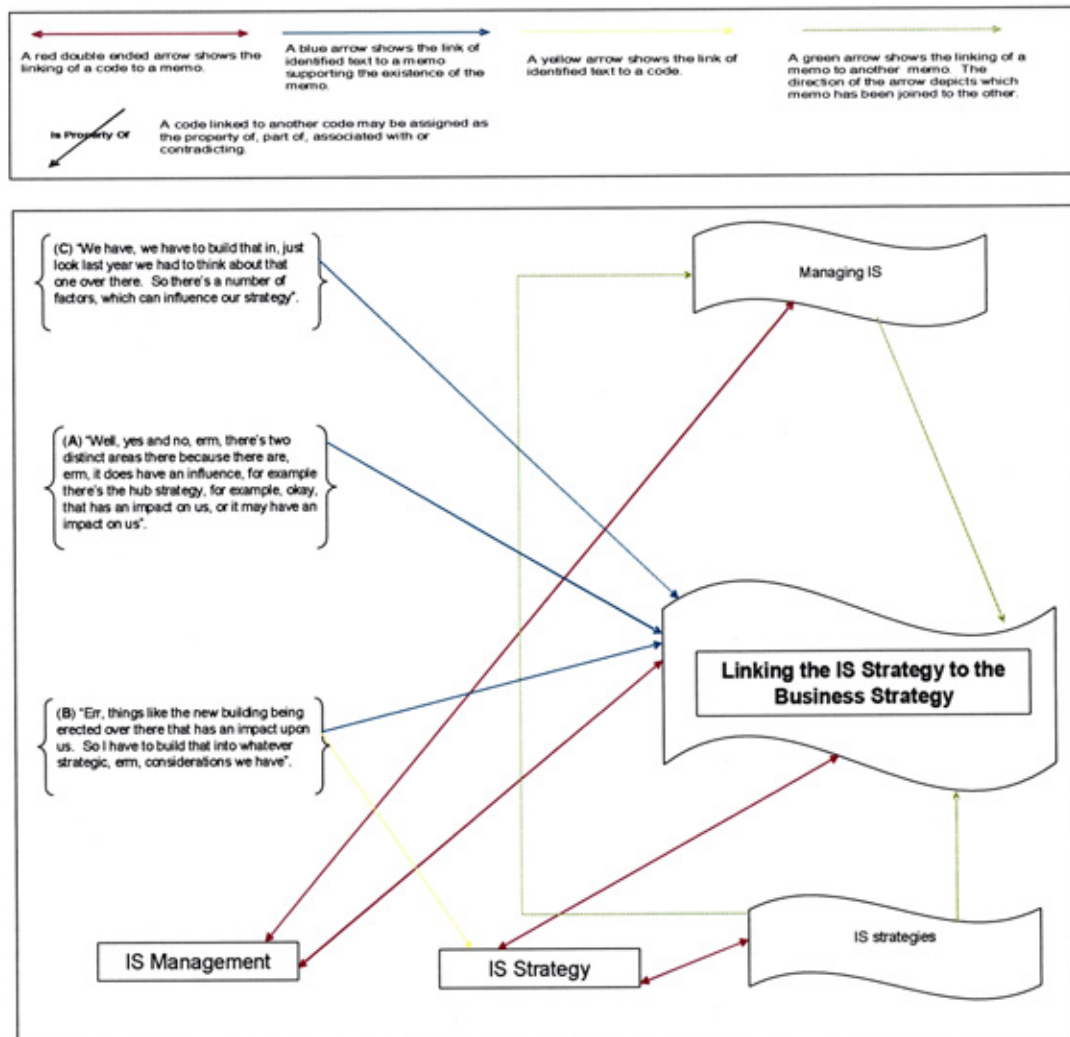


Figure K.9

*Linking the Information Systems Strategy to the Business Strategy for BreathCo*

## Appendix L – Description and Analysis of the Smart Card Project Undertaken in HealthCo

### L.0 Introduction

This appendix provides the rich description of the smart card case undertaken within HealthCo, the initial analysis, and the learning points that have been drawn out. The main method of data collection for this case was interviews. It needs to be pointed out that the earlier interviews were all conducted as unstructured interviews. It should also be emphasised however, that within this case the complete SSM<sup>XLTM</sup> framework was not undertaken. This was due to the project being put on hold after the initial investigation had been undertaken. This was because the project represented a NPFIT (National Programme for Information Technology) government initiative responsible for information systems (IS) projects within the NHS, where this particular body had overall control of the project. This limited the later phases of SSM<sup>XLTM</sup> (phases 8 – 12). The follow up interviews therefore, served as an opportunity to draw out the applicability of the remaining aspects of SSM<sup>XLTM</sup> (phases 8 – 12) from the participants who will be affected by the implementation of the smart card project. This semi-structured interview can be seen in section H.5 of Appendix H. The purpose of these follow up interviews was to perceive how the participants take account of the exploration phases of SSM<sup>XLTM</sup>, and to strengthen the argument that SSM<sup>XLTM</sup> would be of value to organisations to design, implement, and manage ISA with an emphasis on generating learning activities.

### L.1 The Smart Card Project Time Line

Similar to Chapter Six, a time line has been constructed to show which participants were spoken to and when. This time line can be seen in Figure L.1 below.

Month	Nov (2004)	Dec	Jan (2005)	Feb	Mar	Apr	May	June	July	Aug	Sep	
Stage of Project	Undertaking Exploration Stages of the SSM <sup>SLTM</sup> Framework		Smart Card Issuing Software Piloted and Tested		Findings of the SSM <sup>SLTM</sup> Framework Delivered	Project Suspended so no Research was Undertaken During this Period						Final Interviews and Project and Research Close
Practical Work Undertaken and Data Collected	Informal interviews conducted and diary entries recorded on the processes involved with starters and leavers within HealthCo		Remaining two participants informally interviewed on starter and leaver processes. A pilot is conducted on a designated ward on how the technology performs.		The report detailing the findings of the project is delivered to the project leader.	Due to wishes NPIIT the project was placed on hold. This suspension was due to other processes being identified that if the project was implemented would see the duplication of effort throughout the whole NHS. Therefore, an investigation was undertaken by NPIIT to resolve this issue. After a period of five months the researcher could not spend any more time waiting for a resolution to the suspension and proceeded to undertake the final interviews and exit the research site.						Semi-structured interviews recorded on issues relating to technology identification, selection, and managing technologies, training and issues relating to the smart card.
Employees Interviewed												
Information Manager For IT *	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>						<input checked="" type="checkbox"/>	
Workforce Planning Manager	<input checked="" type="checkbox"/>											
Human Resource Employee	<input checked="" type="checkbox"/>											
IT Manager	<input checked="" type="checkbox"/>											
Security Manager	<input checked="" type="checkbox"/>											
Medical Staffing Employee	<input checked="" type="checkbox"/>											
IT Security Officer			<input checked="" type="checkbox"/>								<input checked="" type="checkbox"/>	
Senior Staff Nurse			<input checked="" type="checkbox"/>								<input checked="" type="checkbox"/>	
Personnel Director											<input checked="" type="checkbox"/>	
IT Project Manager											<input checked="" type="checkbox"/>	
IT Security Employee											<input checked="" type="checkbox"/>	

Figure L.1  
A Time Line for the Smart Card Project

**Key**

\* = Project Leader



A number of interviews can be seen to take place within Figure L.1 between participants who require information about new starters and leavers, and hence who will be affected by the smart card project. These interviews investigated the current process for starters and leavers, while a pilot study allowed a perspective to be obtained on how the new process will be conducted. Once the pilot had been undertaken, a report was delivered to the participants of the project, which was used to make a decision on who should be charged with issuing smart cards throughout HealthCo. The final interviews (see section H.5 of Appendix H) investigated the processes undertaken for this case, and the processes HealthCo goes through, in identifying, selecting, acquiring, exploiting and protecting, and evaluating information systems.

It should be noted that, firstly within Figure L.1, the participants spoken to for the exploration phases of the framework (phases 1 – 7) are different to the participants who were spoken to in relation to the implementation and management phases (phases 8 – 12). Secondly, during the period of April until August 2005, no research had taken place. The first issue related to speaking to participants who currently had knowledge of the starter/leaver process, and whose perspectives needed to be taken into consideration, so these could be drawn out and debated. The participants who were spoken during the later stages of the research were participants who had more knowledge of how HealthCo usually implement and manage ISA traditionally, and now as a result of the National Programme for Information Technology (NPFIT). The purpose of these interviews was to investigate if these current processes generate the learning activities that this work argues SSM<sup>XLTM</sup> can achieve.

The second issue of no research being conducted for four months was due to the smart card project being put on hold, with all participants hoping the project would be restarted as soon as possible, so the research could be completed. As this did not happen, a conscious choice was made to interview a number of participants who could discuss how ISA are implemented and managed within HealthCo, with the themes being drawn out being compared to what SSM<sup>XLTM</sup> would achieve, if it was fully used. This project is different to the BreathCo customer concerns project for the following reasons:

- The case was selected as a way to try and test SSM<sup>XLTM</sup> that was developed through the BreathCo case, and apply it within another organisation that display different cultural and political issues. By doing this the outcomes will add to the applicability or refinements that need to be made to the framework.
- The SSM<sup>XLTM</sup> framework needs to be re-tested from the outcomes the BreathCo case demonstrated through the methodology of action research adopted.
- The project was a more expressed and structured problem compared to the BreathCo case. How well SSM<sup>XLTM</sup> would perform had to be investigated along with a variety of different issues.
- The second case, whilst not being conclusive, can add to the generalisations and validity of the conclusions that will be drawn about the usefulness of SSM<sup>XLTM</sup>, and its purpose in generating learning activities through the process of IS design, implementation, and management.

From these objectives, the purpose of this case was to test the applicability of SSM<sup>XLTM</sup>, whilst at the same time to give the participants of HealthCo something of value in the process.

## **L.2 The Problem Situation Unstructured**

Whilst an emphasis on co-operative inquiry was attempted, the project leader explained that he and other people had an idea of the current process that individuals undertake when entering and leaving the Trust (HealthCo). Whilst the project leader appreciated the desire for a greater amount of participation, the project leader wanted the researcher to undertake the project. This presented the problem of how well SSM<sup>XLTM</sup> would work if used, how the theories of the learning organization could be drawn out, and how the learning theories could be identified. This project therefore, not only served to attempt to re-test SSM<sup>XLTM</sup>, but also explored how it could be used in a 'mode 2' approach (as a way to think about problem situations). Even though this may be considered a problem in itself, it was important that the issues of culture and power that are attached to the NHS are kept in mind. For example, this case had issues relating to IS, a body responsible for such projects (NPFIT), and participants within HealthCo who may be all wanting different outcomes. It is not known therefore, if the project leader is aware that an approach such as co-operative inquiry

would be unsuitable, due to other agendas already being set by certain bodies. The SSM<sup>XL™</sup> framework however, would help keep such issues in mind throughout the exploration phases.

From an informal meeting with the project leader, the ideas on how an individual can enter and leave the Trust were sketched out on a white board. The envisioned starter process is depicted in Figure L.2.

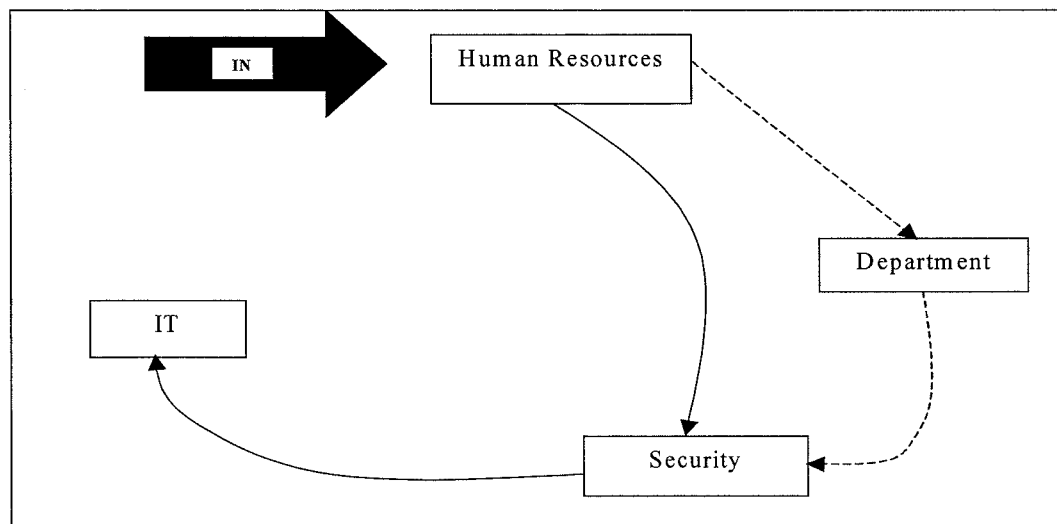


Figure L.2

*The Theorised Process of Individuals Entering the Trust*

When individuals enter the Trust and start work, it is believed they do so through firstly contacting the human resources department. New employees however, may turn up at their department first before going to human resources. Individuals have to attend human resources on their first day to sign their contract officially, allow payment for employment to be made, and to collect an ID badge authorisation form. On collection of the ID badge authorisation form employees could then attend ID badge sessions that security were responsible for issuing. Once an ID badge was obtained, employees could contact the IT department to arrange for an IT account to be set up. All the IT department required was an ID badge as proof of employment. To accompany Figure L.2, the project leader also sketched the process he perceived to happen when individuals leave the Trust. This process can be seen in Figure L.3.



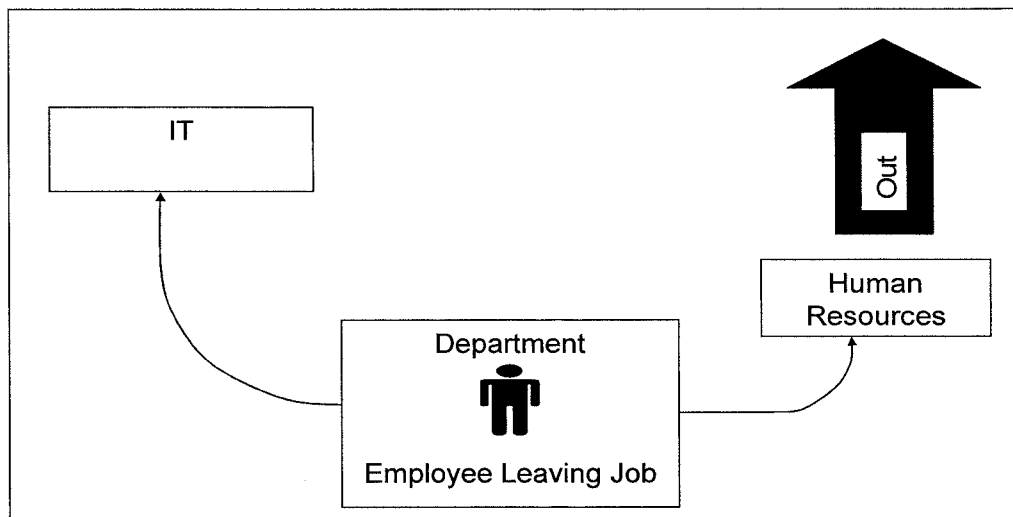


Figure L.3

*The Theorised Process of Individuals Leaving the Trust*

On leaving the Trust, employees are envisioned to inform their department before contacting human resources. The IT department are informed, but it was unknown precisely how. Whilst both Figure L.2 and Figure L.3 presented ideas about the process, it was unknown whose ideas these primarily were. This gave a problem firstly, to the researcher, and secondly, to the project leader who needed to test this mental model. Without a clear process of how individuals enter and leave HealthCo, no decision could be taken on which department or individuals, should be responsible for undertaking this government initiative.

**Learning Point:** *Whilst a greater amount of participation may be sought in order to try and undertake a form of co-operative inquiry, this may not be possible. If a project leader or other individuals, who hold power, do not want to use this approach, a researcher may have to undertake the project themselves and seek participation through other processes, or leave the problem situation unresolved.*

### **L.3 Undertaking the Investigation of the Current Starter and Leaver Process**

With the wishes of the project leader, work began trying to obtain an understanding of the organisation, as well as arranging to meet actors who are currently involved with starter and leaver processes. The project leader drew up a list of interviewees to contact. These interviewees were willing participants who have been made aware of the project for a number of months beforehand. The individuals spoken to (see Figure

L.1) were informed they did not have to participate in the research if they did not wish to. The participants identified by the project leader were spread across three locations. These areas can be labelled as: HealthCoR (where the project leader was located), HealthCoF, and HealthCoG. As can be seen from Figure L.1, the participants included the workforce planning manager, an employee from the human resource department, the IT security manager, the general security manager, an employee responsible for medical staffing (a different part of the HR function), an IT security officer, and a senior staff nurse.

**L.3.1 Structuring the Problem Situation**

Interviews conducted were more unstructured with questions that were unable to be answered being recorded, and asked to other participants until an answer emerged. From the interviews, the following data can be summarised in Table L.1.

Participant	The Workforce Planning Manager	The Human Resource Employee	The IT Manager	The Security Manager	The Medical Staffing Employee	The IT Security Manager	The Senior Staff Nurse
Location	HealthCo F	HealthCoF	HealthCoR	HealthCoR	HealthCoR	HealthCoG	HealthCoF
Issues Identified	<p>* Current delays in individuals receiving a current ID badge relate to the limited number of sessions held where people can obtain their badge.</p> <p>* There may be differences in practice between HealthCoF and HealthCoR.</p> <p>* Problems can occur if individuals forget to bring in documents that can prove who they are, as this is a requirement of starting a job and obtaining an ID badge.</p>	<p>* Two processes for recruitment – medical and non-medical staffing.</p> <p>* Medical staffing employees are located at HealthCoR.</p> <p>* Official documents (e.g., driving license, passport, birth certificate) have to be produced to HR staff before an employee can start work and obtain an ID badge authorisation form.</p> <p>* Only when new employees have officially signed on is an appointment form completed.</p>	<p>* When working within the Trust, all individuals have to sign an acceptable declaration form as a legal requirement, but this still is not sufficient to open an IT account.</p> <p>* The IT department identifies individuals requiring an IT account from the starter and leaver lists created within workforce planning.</p> <p>* Workforce planning compiles the lists for IT from the staff appointment forms given to them by</p>	<p>* The Security department receive a list of new starters who require an ID badge each week from workforce planning, but only receive a leavers list once a month.</p> <p>* A large amount of information held on the ID badge database is out of date.</p> <p>* All medical and non-medical staff have to go through security at some point to obtain an ID badge.</p> <p>* Medical staff seems to be more organised, as these individuals arrive in big intakes at</p>	<p>* Medical staffing is similar to non-medical staffing.</p> <p>* Professional qualifications need to be checked and medical staff need to sign on when they start their jobs.</p> <p>* Medical staff however, have to attend HealthCoR.</p> <p>* All staff must attend Personnel at some point to sign on otherwise they would not get paid.</p> <p>* It is due to issues such as these that departmental managers' may be using informal methods to obtain ID badges and IT</p>	<p>* IT security is responsible for reviewing security issues with new technologies.</p> <p>* Registration authority validation is required for all employees who will issue smart cards.</p> <p>* Information technology security is responsible for securing the Trusts data on issues such as patient records, as well as monitoring the use of the Internet.</p> <p>* For new employees to get registered for a smart card they</p>	<p>* The nurse did not know of any informal procedures individuals could use to obtain an ID badge.</p> <p>* All new staff turned up for their first day of work with a uniform and an ID badge.</p> <p>* From her experience, she has had her current ID badge for a long time, and has only had to update it when she became a senior staff nurse.</p> <p>* The nurse updated her badge by taking a letter from another senior staff</p>

Participant	The Workforce Planning Manager	The Human Resource Employee	The IT Manager	The Security Manager	The Medical Staffing Employee	The IT Security Manager	The Senior Staff Nurse
Location	HealthCo F	HealthCoF	HealthCoR	HealthCoR	HealthCoR	HealthCoG	HealthCoF
Issues Identified continued		<p>* The appointment form consists of three coloured sheets that are identical. The sheet contains employee details that are then sent to workforce planning, payroll with one copy remaining in HR.</p> <p>* Payroll receives P45's while HR keeps the individuals registration.</p> <p>* HR allocates payroll numbers not Payroll!</p> <p>* ID badge sessions are organised by security and are held Tuesdays, Wednesdays, and</p>	<p>Human Resources.</p> <p>* An individual will go to the IT department at either of the HealthCo sites; and produce their ID badge as proof of employment.</p> <p>* If you are a third party contractor, or other non-Trust individuals, you have to sign the acceptable declaration form, as well as a separate confidentiality agreement.</p> <p>* The main problem the IT manager believes relates to when an individual changes department as they</p>	<p>certain times of the year.</p> <p>* Security is only supposed to issue badges when a completed ID badge form can be produced.</p> <p>* On some occasions, a signed letter from the individuals department or the department manager turning up to a badge session has been accepted.</p> <p>* It turns out the current process of issuing badges came into effect in 1994 when it changed from a paper based system.</p>	<p>accounts.</p> <p>* Other differences between HealthCoR and HealthCoF relate to payroll numbers. At HealthCoR, the first four digits of an individual's payroll number are related to a particular cost centre, where at HealthCoF, the first four digits relate to the particular job role.</p>	<p>must produce documents such as a passport, a driving license, or utility bills.</p> <p>* Once the documents have been checked, the individual issuing the smart card will set the individuals access rights for particular software packages, data access, and location access.</p> <p>* The data recorded will then be uploaded onto the national database.</p> <p>* As it is a national programme, all NHS employees will be registered onto one national</p>	<p>member to the security office, and security updated the badge for her.</p> <p>* When staff has left the department, the senior nurse was informed as well as Personnel.</p> <p>* The senior staff nurse states she is not sure what happens to a leavers ID badge.</p>

Participant	The Workforce Planning Manager	The Human Resource Employee	The IT Manager	The Security Manager	The Medical Staffing Employee	The IT Security Manager	The Senior Staff Nurse
Location	HealthCo F	HealthCoF	HealthCoR	HealthCoR	HealthCoR	HealthCoG	HealthCoF
Issues Identified continued		<p>Fridays.</p> <p>* Badge sessions are held at HealthCoF and HealthCoR but not at HealthCoG.</p> <p>* The new ID badge also allows an individual to set up an IT account.</p>	<p>may require different software and access rights to what they currently have.</p>	<p>* From this history, the Trust has tried to establish a set procedure for ID badges.</p>		<p>database.</p> <p>* With such a project stricter security measures are required.</p> <p>* Smart cards will also need to be issued at all times and not at a few designated sessions each week.</p>	

Table L.1

*Participants Perspectives on the Starter/Leaver Process and the Current ID Badge*

Whilst the perspectives shown in Table L.1 so far have investigated the current problems and issues with starter/leavers and ID badges, an investigation into the new smart card that will be issued was undertaken.

**L.3.1.1 The Pilot Study**

As part of the pilot for the software, the technology was tested on a ward at HealthCoF. Seeing how the ISA works, and the data collected, would allow more suitable recommendations about which department should implement the smart card to be made. Observations were made on how the data was input into the software with staff having to enter a password and a pin-number. This aspect of the security is so that the individual is the only person who can use the card. The process however, can be time consuming. In the two hours of observing the registration process, four cards were issued (Researchers Diary, February 2005). This concluded the data collected for this part of the study on structuring the problem situation. It now had to be undertaken for the project team. This posed a problem, as the only participation obtained was individuals giving time to be interviewed. As a consistency check a rich picture was developed. This picture can be seen in Figure L.4.

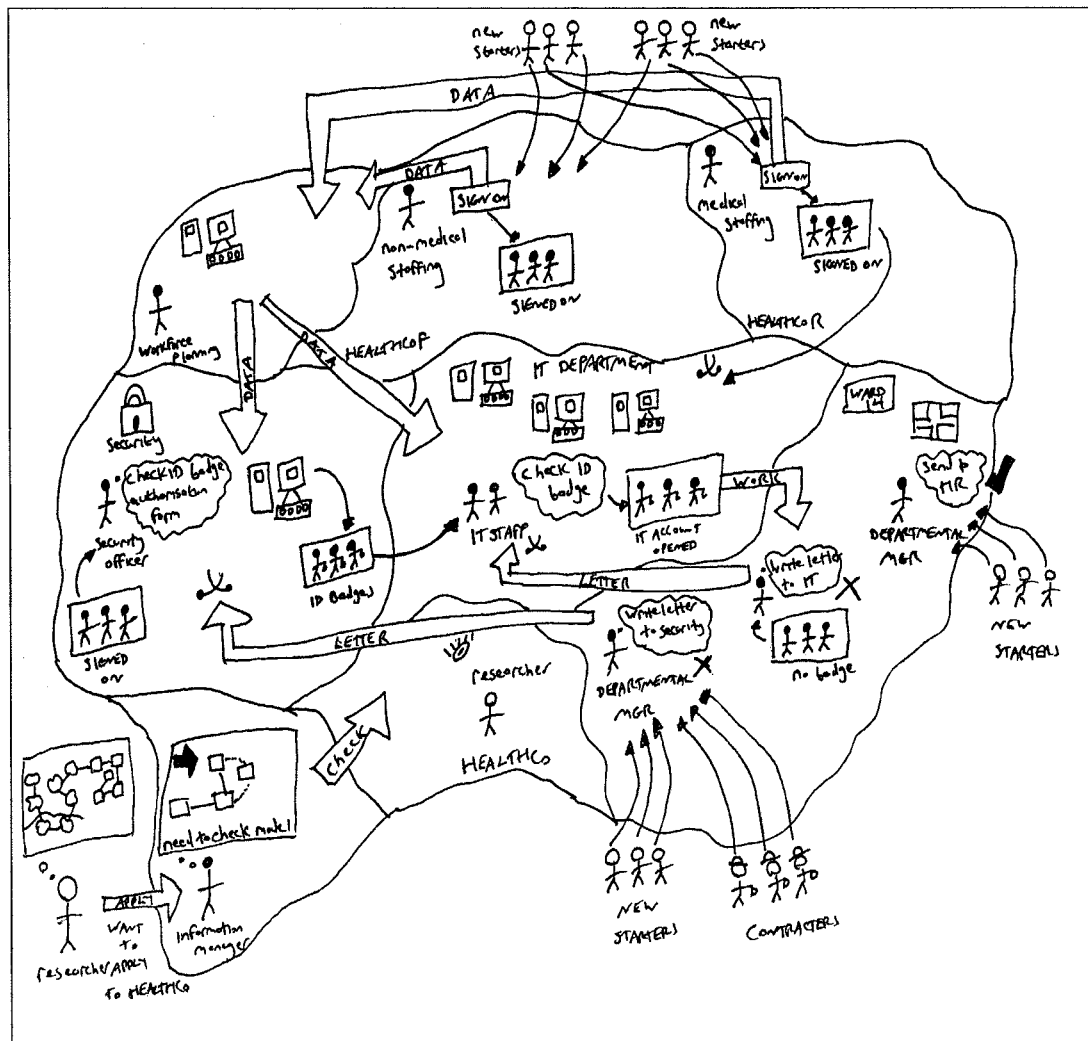


Figure L.4

*A Rich Picture of the Structured Problem Situation at HealthCo*

Figure L.4 tries to show the issues that were uncovered. The information manager wanted the data collected to validate or disprove his mental model. The action part of the project therefore, was to undertake this task whilst the research relates to trying to use SSM<sup>XL</sup><sup>TM</sup>. The researcher can be seen in HealthCo looking at all these issues. Other key issues Figure L.4 demonstrates include, the informal methods used to obtain ID badges and open IT accounts. Figure L.4 also shows the flows of data in the process as well as the correct procedure. This rich picture was not revealed to the participants but contained the same information in the formal report delivered. The time taken to collect the data and understand it, was believed could have been undertaken more quickly, and more insightfully, if all individuals worked together, especially at this phase of SSM<sup>XL</sup><sup>TM</sup> (phase 2).

***Learning Point:** A lack of participation or co-operative inquiry at phase 2, leaves the structuring of the problem situation to a third party, which can detract from any learning that could be achieved.*

To comprehend this problem further, a decision had to be made on how the data uncovered should be modelled and presented back to the participants. An AIM sheet (see West, 1995) was produced, but due to the structured nature of the problem (starters and leavers and ID badges), no participant could use the method or returned the sheet. This may be because the participants saw no value in such an approach which is perceived as more likely because the issue relating to ID badges was not ambiguous or posed many different issues.

***Learning Point:** Tools designed to help explore unstructured problems may not provide much value in more structured problem situations. Other techniques therefore may be required to explore more structured problem situations.*

It defeated the purpose of trying to operationalise the theories of the learning organization SSM<sup>XLT</sup> was expanded to take into account, due to the way SSM<sup>XLT</sup> was being used. The tools and participation issues during phase 2 were the start of using such theories, but due to the wishes of the information manager have inadvertently been by passed.

***Learning Point:** Fuller participation is required during phase 2, to try and use the theories of the learning organization. To do this, tools such as AIM and rich pictures need to be used and made explicit to all the participants who are working together.*

#### **L.3.2 Developing Root Definitions – Phase 3 and Conceptual Models – Phase 4**

On identifying the smart card project and talking with the project leader, it was considered that options were available that could influence the recommendations and hence the outcome of the project. As the project progressed, it was uncovered that this was not possible and therefore, the outcome of the exploration focused more on learning about which department would be best suited in managing and operating the



smart card software. This was an important focus for which models should be used for dialogue and language development.

Coming to the systems theory aspect of SSM<sup>XLTM</sup>, a decision had to be taken on how modelling should be presented. Like the BreathCo case, the participants did not make time to learn the principles of SSM or SSM<sup>XLTM</sup>. The issue of developing a CATWOE and revealing this to participants to model may be a disadvantage, as participants may be put off by such an approach. This mental model held was not fully tested. The key points in modelling relate to time and participation. It was decided that the best way to proceed was to develop a number of root definitions, CATWOE's, and model the outcomes, before feeding back the findings to the project team. This could be compared with what Lewis (1994) undertook in removing the language of SSM (cf. Lewis 1994) or as West undertakes through using AIM (see West, 1995; West, Stansfield and Stowell, 1994).

This approach offered two advantages. Firstly, it allowed more sense to be made of the problem situation, and use the principles of SSM and other processes built into SSM<sup>XLTM</sup> in identifying the cultural issues. For example, whilst participation was attempted to encourage individuals to become co-researchers and co-subjects, it became part of the initial intervention analysis, as individuals would have a better understanding of why the study was taking place and be committed to the research. The problem is whatever is modelled has to be presented back, so these issues needed to be kept in mind when constructing the root definitions and conceptual models. Through being involved in the organisation, the social system that was observed allowed the roles, norms, and values to be kept in mind, especially when constructing any models and presenting these back to the participants. This is important as any suggestions taken up could alter the current social system for the worse. The final analysis relates to politics. This is also very important, especially when conducting research within the NHS, as even though participants could not be co-opted into the research process formally, their well being is still important. These participants and other individuals, who have an interest in the research, were kept in mind as the problem was being investigated, during the modelling, and how the models will be fed back to participants. With these issues being formally addressed, the modelling was undertaken that could be presented back to the project team in a report format.

Undertaking root definitions posed a problem. This aspect of soft systems promotes modelling different ‘systems’ based on different view points that could be incorporated. This project however, had a more structured element to it, in the sense that smart cards will be issued. The systems aspect does not take into account processes in the ‘real world’, but requires systems to be modelled that would improve the problem situation. Certain processes have to be undertaken and need to be included within any models. Any root definitions and conceptual models may be stated as inappropriate or pointless. This argument is refused, particularly as it allows modelling and thinking about the problem situation in a different manner. Based on what is considered a derived perspective argued to be initiated by NPFIT it was decided to form the first root definition of:

*A National Programme for Information Technology (NPFIT) owned and HealthCo ran system to issue employees with smart cards in line with the Government legislation guidelines.*

As this root definition is very general, but at the same time useful, it takes what perspective NPFIT state is the process that each Trust must conform to. A further two root definitions were derived that incorporates perspectives more relevant to the participants of HealthCo. These perspectives try to take action to improve the situation of which department should issue smart cards. Whilst these definitions have been developed, it has to be remembered they are from the perspective of the researcher based on the data collected from the participants. This is important, as other project team members may have focused on other issues. These two root definitions were stated as:

*A National Programme for Information Technology (NPFIT) owned and HealthCo rand system for security to issue employees with smart cards in line with Government legislation guidelines.*

*A National Programme for Information Technology (NPFIT) owned and HealthCo ran system for Human Resources to issue employees with smart cards in line with Government legislation guidelines.*

The first root definition is stated as the main priority of the project to issue all employees with a smart card. How this is undertaken is not a concern for NPFIT. This root definition can provide an overview of what processes will be required in any action taken. The second root definition takes the perspective of designing a 'system' that retains the status quo within HealthCo, with security taking responsibility for issuing smart cards. The third and final root definition draws on the work undertaken during investigating and structuring the problem situation. From this work, the duplication of effort undertaken by human resources was highlighted on the medical and non-medical staffing side to sign up an employee, and for the same employee to obtain a new smart card when they are introduced. A root definition exploring a 'system' where human resources issue the smart card is constructed. By having a number of root definitions comprising different 'systems', different perspectives, and learning can be achieved through the CATWOE's and any models developed. The CATWOE's for each root definition are shown in Table L.2 below.

<b>Elements of CATWOE</b>	A National Programme for Information Technology (NPFIT) owned and HealthCo ran system to issue employees with smart cards in line with the Government legislation guidelines.	A National Programme for Information Technology (NPFIT) owned and HealthCo ran system for security to issue employees with smart cards in line with Government legislation guidelines.	A National Programme for Information Technology (NPFIT) owned and HealthCo ran system for Human Resources to issue employees with smart cards in line with Government legislation guidelines.
<b>C</b>	New starters/current employees	New starters/current employees	New starters/current employees
<b>A</b>	HealthCo staff	Security Employees	Human Resource Employees
<b>T</b>	New and current employees without smart card → Employees with smart card	New and current employees without smart card → Employees with smart card	New and current employees without smart card → Employees with smart card
<b>W</b>	The Government has issued this process so it has to be undertaken.	The Government has issued this process so it has to be undertaken.	The Government has issued this process so it has to be undertaken.
<b>O</b>	HealthCo	HealthCo	HealthCo
<b>E</b>	Legislation / People will need to be RA Trained / Software needs to function correctly / Proper ID	Legislation / People will need to be RA Trained / Software needs to function correctly / Proper ID	Legislation / People will need to be RA Trained / Software needs to function correctly / Proper ID

	documents are required.	documents are required.	documents are required.
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Table L.2

*Elements of CATWOE for the Three Derived Root Definitions*

Similar to how the root definitions were constructed, the elements of the CATWOE have been derived based on the perspectives drawn out from investigating the problem situation and checked against the root definitions. Through Table L.2, a majority of the elements are the same in all three 'systems'. These elements represent the customers, the transformation process, weltanschauung, owner, and the environmental constraints. Whilst SSM is undertaken to explore unstructured problems, which can incorporate a number of customers, actors, transformations, weltanschauungs, owners, and environmental constraints, this was not so for this project due to a structure being placed on the project. Whilst other SSM users may abandon using the approach and concede either a different approach is required, or not continue with the research, it is argued that the SSM<sup>XL™</sup> framework developed can still add to the learning that can be achieved. The learning can focus on what issues relate to NPFIT, issues that will concern participants of HealthCo, and issues for a researcher in particular, attempting to use SSM<sup>XL™</sup> in a more structured problem situation.

From the three root definitions and CATWOE's, three conceptual models were constructed, and similar to how the CATWOE's were displayed above, are placed next to each other so comparisons can be made. These conceptual models are shown in Figures L.5, L.6, and L.7 below.

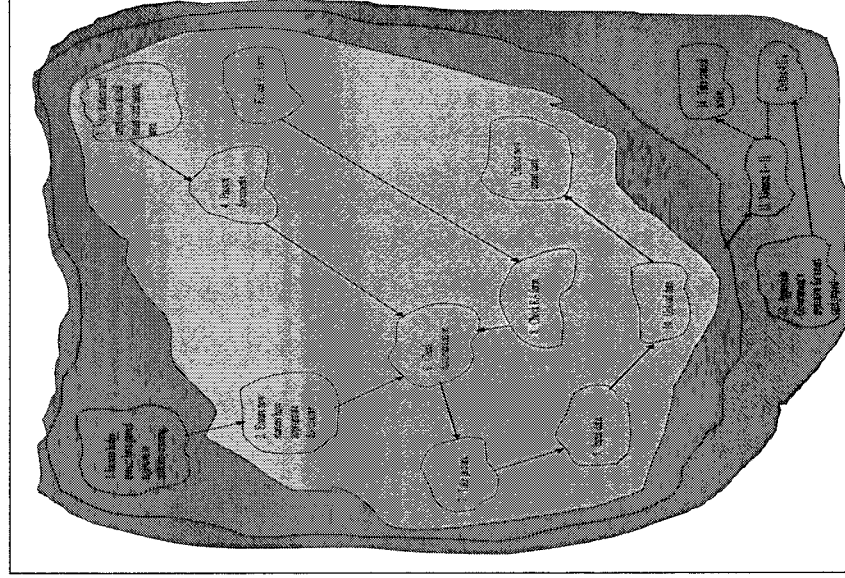


Figure L.5  
A Conceptual Model Based on the General  
Process for Issuing Smart Cards

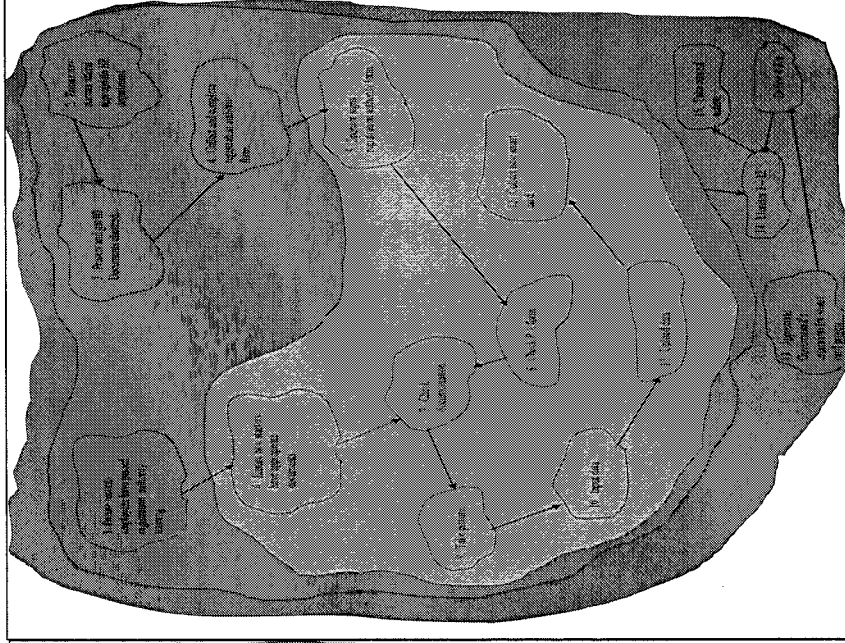


Figure L.6  
A Conceptual Model Based on  
Security Issuing Smart Cards

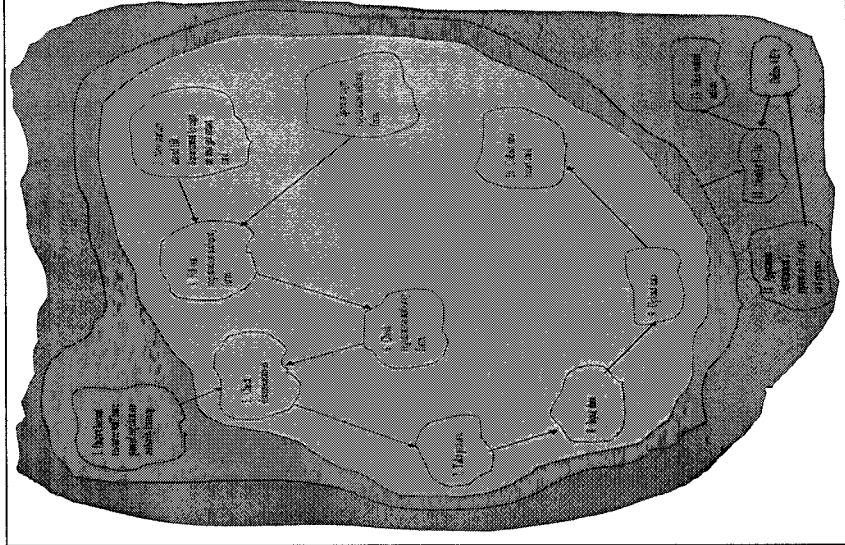


Figure L.7  
A Conceptual Model Based on Human  
Resources Issuing Smart Cards

Figures L.5 to L.7 display the models derived from the perspective of the researcher from the root definitions and CATWOE processes. It needs to be highlighted that due to the structure imposed on the project, the activities that make up the conceptual models could be argued to not represent true processes that a conceptual model depicts, due to labelling activities that exist in the real world. Whilst this is accepted, it is pointed out that the activities that need to be included, are included, and the way that they can relate to each other has been shown. Depending on the 'system', some conceptual models have fewer activities than others, as well as having activities that take place at different points in the 'system'. Whilst traditional SSM implies issues that make up the 3 E's (efficiency, efficacy, and effectiveness), for this project there is a need to incorporate a fourth 'E', that of Ethics. This is argued as important, especially when models are constructed by an individual who is external to the problem situation that could inadvertently propose action that could be harmful to the participants of the organisation. As participants were not interested in engaging fully in the research process this fourth 'E' is important.

Figure L.5 is a general conceptual model for the smart card issuing process. It should be noted that a number of processes need to be in place for any 'system' for issuing smart cards within HealthCo. For example, employees issuing smart cards need to have undertaken the registration authority training. Secondly, the required documents need to be presented and checked along with the registration authority form for any smart card to be issued. Finally, all data needs to be updated onto the national database. Figure L.5 marks the key processes and the core of this first root definition and conceptual model. The system can be seen to originate from the governments, or NPFIT's requirements. The 4 E's that need to be taken into account need to be identified and stated slightly differently to standard SSM conceptual models. For example, for efficacy, the overall process is quite structured through the government and NPFIT, but how these processes are undertaken is what is important. It is required that an employee's picture is taken on the day of the card being issued, and cannot be taken at an earlier stage, neither can an employee bring a photograph of themselves to the session. This process can only be undertaken if all documents are present and correct, and the data is to be uploaded onto the national database. In the case of efficiency, technology resources are not the concern of HealthCo, even though they have to work, and depending on the condition of the hardware, it could take

longer to issue smart cards. Issues such as these have to be discussed. Along with this issue, those who issue smart cards may require more or less resources, depending on how the cards are to be issued.

Effectiveness has mainly been defined prior to the investigation, as NPFIT state the exact processes that relate to the smart card. These specifications relate to specific documents individuals require as well as individuals being required to receive specific training. Even though these issues have been stated, there is room for manoeuvre on how the card issuing is done. More or less resource could be consumed depending on how HealthCo choose to operate the 'system'. This choice could relate to the fourth 'E' of ethics. As responsibility for investigating this problem and making recommendations was delegated by the project leader to a single individual, even though more participation was sought, only highlighting the issues and perspectives that are considered important may neglect other issues that are just, or more important. How the models are derived and the potential outcomes for selecting a particular 'system' are important.

Figure L.6 depicts how HealthCo would issue smart cards if security were the actors in the transformation process. As Figure L.6 displays, before getting to the process of issuing smart cards there needs to be security employees appropriately trained to undertake the task. Second to this process, employees need to attend the correct human resources department to sign on, collect, and complete the registration authority form. Parallel to this process, employees need to present their identity documents for human resources to check for the purpose of signing on for employment within HealthCo. More processes need to be undertaken at this level of the 'system'. Once this has been completed, an employee can proceed to their department where the sponsor (departmental manager) will sign the registration authority form, or accompany the employee to get the smart card. The problem is that the identity documents presented to human resources need to be presented again, along with the registration authority form. This process allows an employee to obtain a smart card with this 'system'. Whilst this system is effective, there could be questions raised about certain other 'E's of the system. For example, the efficacy of the system works but could be seen as requiring a greater number of processes for the 'system' to work. This brings the question of the efficiency of the system. The

efficiency of this system could be inferred as requiring duplication of data and effort which could be reduced. The final 'E' of ethics relates to how security employees think about being the actors responsible for undertaking the transformation process that NPFIT requires. Selecting this second 'system' would require security to present their perspectives and thoughts even though they undertake the current ID badge process. This thinking led to the third root definition and the conceptual model shown in Figure L.7.

Figure L.7 depicts the final root definition in conceptual model form. Comparing this model to Figure L.6, the system identifies human resources to be the actors and undertake the smart card issuing process. Human resources will combine two processes in checking employee's identification documents for signing on as well for the smart card process. In this 'system', like the previous two systems, human resource employees need to be trained for the registration authority process. Whilst employees need to attend human resources to sign on, this system also captures employees to issue them with a smart card, which is required for their work. Any employee requires a smart card to work, and so has to attend where smart cards are issued, which is human resources. The system can be considered as efficient as it reduces the number of processes required to get a smart card. The human resources department however, may require more resources than they currently have in Personnel to issue smart cards, as well as sign people on to make the 'system' work. Similarly to the previous system, human resource employees need to be brought into the dialogue and their perspectives gained, and along with other issues, if the system is to meet the criteria assigned as ethics. Human resource employees may argue more resources will be required as well as more staff to undertake and make the system more effective.

These root definitions and conceptual models helped clarify the thinking that would be required in making suggestions for such a 'system'. From the data collected at phase 2, and speaking with participants, current processes are in place due to history more than power or politics. With NPFIT's requirements to issue smart cards, these processes needed to be modelled. The modelling exercise proved useful in this case. For example, deciding the project is too structured may not have allowed a debate to be undertaken on who the actors of the problem situation are that need to carry out the



transformation process. Other approaches to investigating this may overlook what could be highlighted as a trivial issue. Secondly, the learning that this has provided is important, as further learning about how the project can affect different departments and the actors issuing smart cards, the resources, and the effect this can cause can also be explored. The problem is that the learning is occurring but not for the participants of HealthCo due to the lack of participation.

***Learning Point:** When modelled, more structured problem situations could still provide different perspectives, and help explore more suitable 'systems'. Even though a problem is more structured, learning activities can still be created through the use of SSM<sup>XLTM</sup>.*

The learning point highlights the positive effects that SSM<sup>XLTM</sup> tries to achieve. However, the models developed have to be firstly, compared against what was uncovered during phase 2 to check what has been modelled relates to the problem. Secondly, the models developed have to be presented back to the participants to hopefully create a language and dialogue around. This can be stated as a problem in itself.

### **L.3.3 Comparing the Root Definitions and Conceptual Models with Phase 2**

From moving back from systems thinking to the real world, the models were compared to what was undertaken at phase 2. Whilst the issue is held that the participants who constructed the models should undertake this comparison, so that a debate about purposeful action can be undertaken, this was not undertaken at this stage of the research due to them not receiving the research back. This comparison therefore, was firstly undertaken with the hope that phases would be re-visited by all participants on feeding back the work and the models. Checkland (1993) elaborates on four processes that can be used to help with this task, but it was left for the researcher to undertake, as it was he who constructed the models. It was decided that formal questioning would be the most suitable method for comparison. This process was used in a similar manner to how phase 2 was undertaken. Structured questioning also allowed issues associated with the cultural stream of SSM (cf. Checkland and Scholes, 1990) and SSM<sup>XLTM</sup> to be taken into account before presenting any data back to the project team.

As a number of processes had to be included in the 'system', not every activity was identified or included in any tables or matrices (cf. Checkland and Scholes, 1990) that could be used to compare the models. Focus was placed upon the activities that were highlighted within the discussion of the four 'E's in the previous section, namely:

1. Whoever issues the smart cards requires training.
2. The role of human resources and security in the process.
3. The issue of the sponsor signing the registration authority form or accompanying the employee to get their smart card.
4. The duplication of effort.
5. The use of resources
6. Obtaining an IT account.

These six points can be seen and compared with each conceptual model through Table L.3.

Point	Conceptual Model One	Conceptual Model Two	Conceptual Model Three
1	Senior individuals need to discuss this issue, as it is unknown.	Security manager needs to address this issue with his staff and senior individuals.	Human Resources manager needs to address this issue with his staff and senior individuals.
2	Process developed from how government has stated the smart cards need to be issued. Trusts are left to decide who should issue smart cards.	Process is similar to current identification badge process. Security manager states any help would be a benefit to his department, due to the requirement to issue cards full time.	Security not involved. Unknown what issues the human resource department currently has.
3	Sponsor meets employee at smart card issuing department	Sponsor signs registration authority form when employee turns up to work within the department.	Sponsor meets employee at human resource department.
4	None. Signing on process not taken into account.	Lots. Identification required at both human resources and security in issuing smart	None, human resources controls all processes.

Point	Conceptual Model One	Conceptual Model Two	Conceptual Model Three
		cards. Issues human resources and security need to discuss.	
5	Additional resources may be required.	Additional resources may be required.	Additional resources may be required.
6	Same as current system.	Same as current system.	Same as current system.

Table L.3

*A Matrix Designed to Identify the Issues Coming out of the Three Conceptual Models with the Real World*

It needs to be highlighted that when somebody can undertake phases of SSM<sup>XL™</sup> for an organisation or project manager, there comes a time this can not be undertaken. For example, Table L.3 has posed questions that only the individuals in the organisation can answer, and need to answer, if any models are to be used as a dialogue to improve the problem situation.

**Learning Point:** *Participation in the problem situation by individuals needs to occur at some point when using SSM<sup>XL™</sup>.*

This learning point and the point about obtaining fuller participation are very relevant. Feeding back this data to the participants may require going back to phase 2 of SSM<sup>XL™</sup>. This issue may then allow the theories of the learning organization to be activated that were missed due to the lack of participation the first time around. If this is not the case, learning organization theories may be able to be used on the models presented within the report. This may allow participants to compare the models with the data collected at phase 2. Due to the participants not wanting to become engaged in the research process, or learn about the theories of the learning organization, it is presumed this would not be able to happen. The comparisons that will be undertaken, may generate more participation and questioning through issues such as dialogue (cf. Dixon 1998), even if processes such as shared visions, mental models, team learning, and personal mastery may not be able to develop (cf. Senge, 1990; Senge et al., 1994).

*Learning Point: Phase 5 could be used to try and encourage greater participation from individuals to re-visit phase 2 themselves, or use the models that have been produced at phase 4, to try and enact theories of the learning organization, which was the intent of the learning framework. It is believed that greater participation in the research process is required for this to be achieved.*

In order to try and encourage participants to revisit phases, or construct new models themselves, what was presented to the participants would be important. Whilst root definitions and conceptual models helped draw out the important issues, these may not be as well received by the participants. This thinking was highlighted from the participants of the BreathCo case. This mental model was not tested with the participants of the project. For example, a report could have been written based around the root definitions, the CATWOE's (Table L.2), and the conceptual models (Figures L.5 to L.7). It was decided through an earlier discussion with the project leader, and what was explained by the IT security manager, that due to the culture of HealthCo, it was preferred that data would be communicated back through familiar processes, such as block and data flow diagrams, or tools that are contained within the PRINCE methodology. Problems such as these can come up in other organisations. If SSM<sup>XL</sup>™ is to be of use in dialogue and creating a shared language through the models presented, other processes may be required to be undertaken as part of the modelling exercises.

Feeding back the data was required in a report format, but used the IDEF0 software to present the models, and highlight the important issues demonstrated in Table L.3. An example of the IDEF0 software used in this study can be seen in Figure L.8.

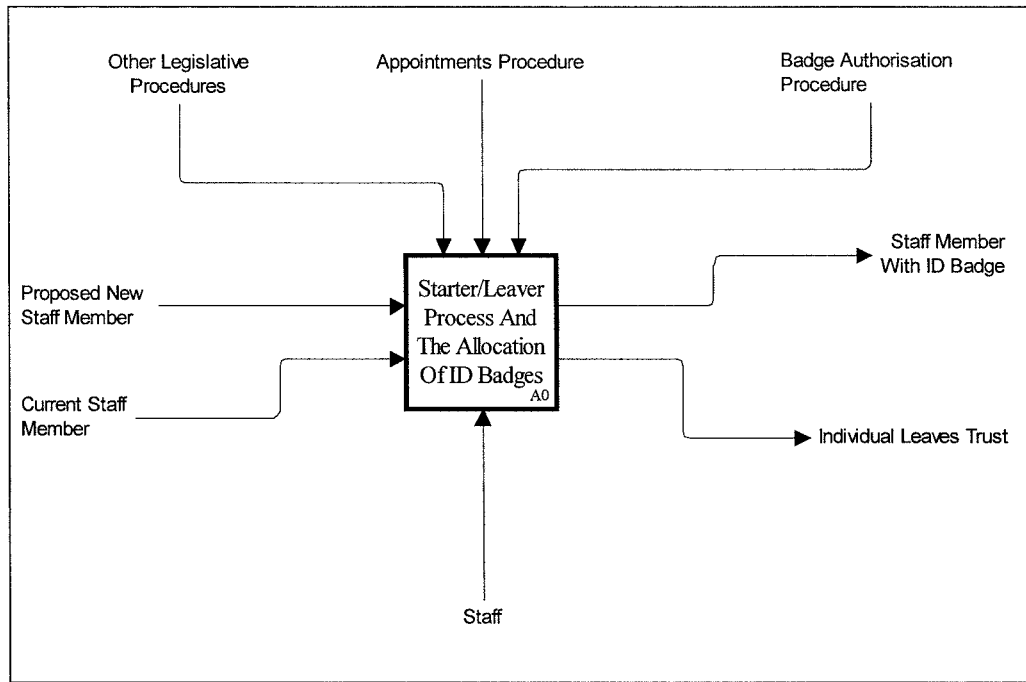


Figure L.8

*The Use of IDEF0 to Present Models Back to the Participants*

Figure L.8 demonstrates how the data collected and the issues highlighted through the conceptual models were eventually presented back. It should be noted that whilst the rules of modelling in IDEF0 are more structured, there could be similarities to how conceptual models are presented. For example, IDEF0 models starts at the top level of any process to be modelled, and move downwards displaying as much detail as regarded useful. At the top level, it could be argued the process is at the highest level and depicts a 'system' that is being modelled (e.g., the starter/leaver process and the allocation of ID badge system). In any lower levels, there can be processes that can be seen at their lower level, and so on. Conceptual models take a systems perspective in assembling processes whilst not focusing on what can be compared in the real world. IDEF0 models require a set of rules to be used. Using Figure L.8, these rules take the form of inputs that are converted through the process (in this case the starter/leaver process and the allocation of ID badges) to an output. This is similar to the CATWOE, but IDEF0 requires mechanisms (in the example staff) and controls (badge authorisation procedure, appointments procedure, and other legislative procedures). Any omission of these four rules has to be taken rationally and justified for a model to be declared as valid. Whilst the IDEF0 tool has attempted to apply a software package to modelling, this topic has not been lost within the area of SSM research. Authors such as Avison and Golder (1991), Avison, Golder and Shah

(1992), and Davenport and Ayers-Hunt (1995) have attempted to use software to help with the construction of rich pictures and other processes within SSM. The conclusion of adopting software for help undertaking the process of SSM relates to too much structure being placed on participants trying to undertake SSM. Whilst the same can be said of IDEF0, the approach is quite flexible and can include as many levels to the models as the modeller requires.

Whilst it can be argued IDEF0 models use real world processes through the mechanisms and controls in how a 'system' will work, it can offer advantages. For example, it can raise questions on specific issues that may result in a dialogue or test certain participant's mental models. Once an input, output, mechanism, and control have been modelled at any level, these processes will be present at the lower levels of the model, making the modeller think about how a process functions. An example of the next level of the model depicted in Figure L.8 can be seen in Figure L.9.

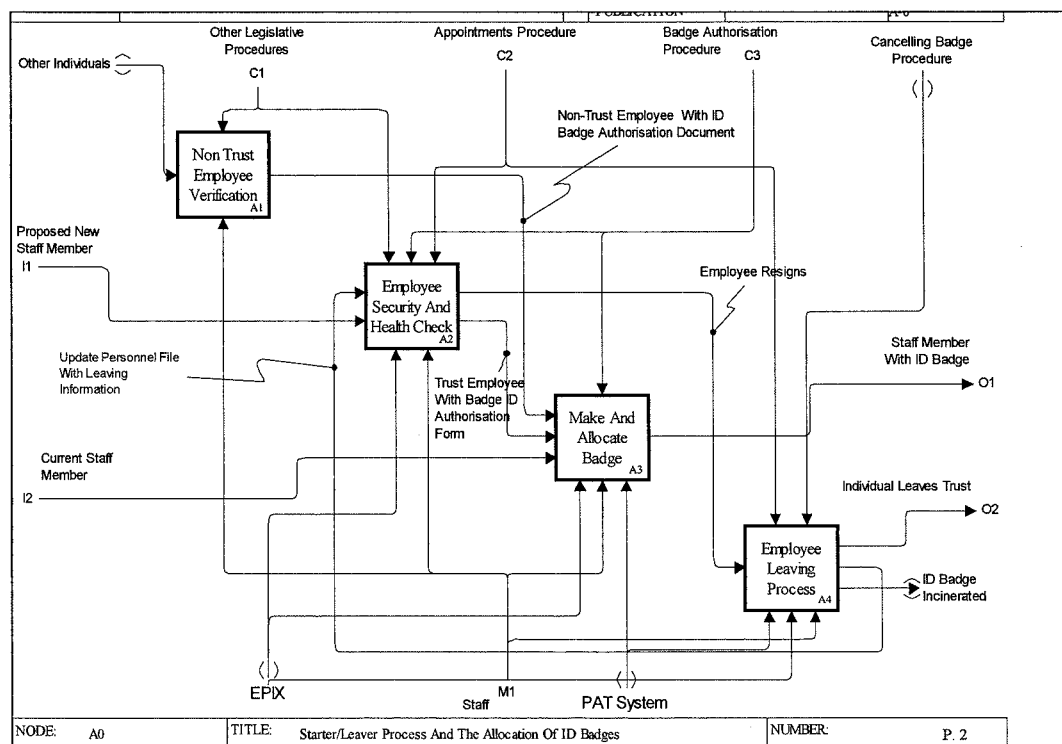


Figure L.9  
*The Lower Level of the Model Shown in Figure L.8*

Figure L.9 demonstrates other processes associated with the starter/leaver process and the allocation of ID badges. Each of the processes shown contains lower level

processes within them. Each level can generate new questions that may not be addressed using other methods. Whilst not a formal conceptual model, the software can depict the current 'system' that is in operation whilst a second model could depict a system that could be used to take purposeful action. This was not undertaken as it was hoped that the participants would use the models created to do this, as well as use the other data collected and suggestions offered within the report. The report finalised the comparisons phase of SSM<sup>XLTM</sup>. The report was presented back to the project leader in March 2005. It was discussed that the project team would review the report, models, and compare what data was collected at phase 2. This did not happen due to NPFIT identifying a similar process being undertaken for another part of the NHS. The issuing of smart cards was proposed to be joined with these other processes. Essentially, at the end of March and early April 2005 the smart card project was suspended. Whilst this may not have allowed the first phases of SSM<sup>XLTM</sup> to be fully re-tested, it had provided a number of learning points to consider.

The project may have been suspended, but a number of participants of the project team were contacted for interviews (see Figure L.1) to explore the issues relating to technology management within HealthCo and the NHS; as well as the smart card project. Due to this suspension and other issues within HealthCo, it took a number of months to obtain the participation of the interviewees. HealthCo still needed to take purposeful action as whether the smart card would be implemented or combined with other processes. The same issues needed to be explored and planned for, arguing the research already conducted as valuable. The main issues with the smart card project investigated how the work undertaken contributed to decision making processes.

**Learning Point:** *A researcher or consultant using SSM<sup>XLTM</sup> while trying to uphold the 4E's, may find the testing of personal mental models restricted. Using a co-operative approach allows greater testing of personal mental models, as other participants are involved in collecting and owning the data, which could enable a greater number of mental models to be tested.*